'Doing the Portfolio' – Pre-registration training for biomedical scientists and developing the capable practitioner

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Abstract

Integration of work-placements into undergraduate degrees is now established on awards linked to professional registration in healthcare. Pre-registration training forms the basis for development of capability and entry onto a professional register. This enquiry explores how key stakeholders on a programme leading to registration as a Biomedical Scientist (BMS) position themselves in their role and the subsequent impact of this upon the development of the capable BMS. It draws upon current knowledge of work-based pedagogy and utilises a constructivist grounded theory (CGT) approach to explore the perceptions and experiences of individuals and groups to develop an interpretative portrayal and deeper understanding of the implementation of pre-registration training in one region of England.

Data gathering and analysis was divided into two stages. The first employed analysis of professional documents to provide an insight into current discourses around BMS training. This provided initial developing categories and directed the creation of a questionnaire. Questionnaire responses confirmed the relevance of the developing categories and a summary of responses provided an 'ice-breaker' to guide stage two of data gathering. This stage employed focus groups and interviews to enable a greater understanding of how individuals make sense of their experiences. Initial, focused and theoretical coding allowed synthesis and conceptualisation of the data gathered and presented direction for the enquiry.

The findings expose the challenges of integrating professional registration training into an academic programme of study. Three theoretical categories were identified: *Role conflict, Expectations and Ownership.* Conceptualising the interactions and intersections of these categories enabled the recognition of *'Doing the portfolio'* as a way of describing and conceptualising the stakeholders positioning within the current programme. The registration portfolio has become an objective reductionist measure of learning, reflecting the positivist typology of practice in this profession. This provides a theoretical explanation as to how the programme is delivered and why there is a need to rethink conceptualisation of the role of the programme in supporting pre-registration training and the development of the capable BMS.

To ensure that BMS students are supported to develop not only technical skills but also professional capability there is a need for a paradigm shift from a positivist episteme to one that embraces both the positivist and socio-cultural paradigms, viewing them as complementary and parallel.

The novel research approach used in this enquiry has generated rich insights into how stakeholders interact with the pressures of internal and external influences and the impact this has upon behaviours and strategies adopted. The theoretical understanding proposed, which recognises the tensions emerging from a positivist typology of practice, has a range of implications for practice and for the development of practitioner capability through pre-registration training and beyond.

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Chapter One – Introduction to Thesis

1.1 Context of enquiry - Degree programmes linked to professional practice

This thesis explores the delivery of a BSc Applied Biomedical Science award provided at a post-1992 University and linked to pre-registration training for entry onto the professional register for biomedical scientists. In the past few decades there has been a move in the United Kingdom to ensure that degrees are more applicable to the world of work. The inclusion of work placements or work-based activities as an integral part of a degree programme is one approach to supporting this aim and is the method adopted for this biomedical science award. Such integration of work based learning into higher education programmes has been guided by key themes in government and professional body discourses on practitioner education and capability development (Dearing, 1997; Leitch, 2006; Darzi, 2008a; Darzi, 2008b). This integration, which aims to foster professional and educational development, is now well-established in the professions of nursing, medicine and teaching and the theories and concepts that I draw upon in this enquiry have been influenced mainly by research in these three areas. The epistemological underpinning of work based learning is embedded in a form of pragmatism where knowing and doing support learning (Brodie and Irving, 2007). In addition, a constructivist perspective sees individuals making sense of their learning through active participation in practice in the workplace setting (Lester, 2014).

1.2 Aim of the enquiry – positioning of stakeholders

This thesis investigates how key stakeholders (students, laboratory training officers, laboratory managers and academics) involved in the BSc Applied Biomedical

Science award which is aligned to a professional qualification (incorporating a period of work-based learning) position themselves in their role: and how this positioning impacts upon support for the development of capable practitioners. Positioning is often used to describe an individual's stance on something; how they locate themselves in relation to a situation or process (Wellington, 2000, p.43). In this context I have used the term to embrace and define the individual's perceptions of roles and responsibilities and to articulate the approaches individuals themselves adopt as they take on these various roles. Positioning in the context of this enquiry affects approaches taken to support 'knowing' and 'doing' for practice as well as how individuals 'make sense of' their learning experiences.

My use of the term stakeholder to refer to the students, laboratory training officers, laboratory managers and academics stems from my belief that they are the key individuals and groups who can and should drive the development of capability in the BMS profession. The concept of stakeholder emerged from management theory with a broad definition given as 'any group or individual who can affect or is affected by the achievement of the organizations objectives' (Freeman, 1984, p.46). The term stakeholder is a key concept in this enquiry involving individuals from a range of different NHS Trusts and practicing in different disciplines within biomedical science.

1.3 Development of the enquiry

The focus for this enquiry emerged from the outcomes of a small study undertaken as part of the taught element of the educational doctorate programme. My initial aim was to investigate the levels of critical reflection demonstrated by biomedical science students during their placement year which forms part of the BSc Applied Biomedical Science award (Smith and Martin, 2014). The award integrates work based

experience with the students' academic studies. The work based learning occurs in a pathology laboratory, and students are required to produce a portfolio of evidence to document their achievement against professional standards set by the professional registration body (HCPC, 2014). Successful completion of the award allows a student to apply for professional registration with the Health and Care Professions Council (HCPC) and to practise as a Biomedical Scientist (BMS). In my professional role I had identified concern voiced in regional meetings by employers of BMSs that many students who have successfully completed their registration training struggle to apply themselves in the laboratory when employed as a BMS. As a BMS and the course leader I was concerned that students are not being adequately prepared for practice and the impact this may have upon the profession and future practice.

The small-scale study that I undertook before beginning the thesis stage of the doctoral programme used action research as outlined by Elliot (1991). The aim of that study was to support the development of a critically reflective approach in students to assist them in developing in their role. Since critical reflection is identified as essential to transform experiences into learning and to support the development of the capable practitioner, (Boud, Keogh and Walker, 1996, p.7) the development of this skill in the student seemed an important starting point. However, my findings from that study identified that the lack of critical reflection demonstrated by students in their practice results from the approach adopted for curriculum delivery by university tutors and workplace trainers rather than being linked to the students' ability to make the required conceptual links; students were not encouraged to be reflective practitioners but to merely record activities performed during their work based placement to enable assessment against defined procedural outcomes.

Similar to other professions the curriculum for the biomedical science award has a defined set of learning outcomes which are adopted to direct the programme content (academic and work-based). These learning outcomes are informed by a review of the knowledge and skills required by the biomedical science workforce. The ongoing review of these requirements is directed by both the regulatory and professional bodies and as a continuous process they publish regular updates to ensure that the standards reflect any changes in practice (HCPC, 2014; IBMS, 2016). Successful demonstration of knowledge and skills in the areas addressed by this guidance and the learning outcomes they identify are essential in supporting the development of a capable BMS.

The achievement by students of a programme's learning outcomes is dependent upon a range of factors. Biggs (2003, p.26) recognises that teaching methods and assessment tasks should be specifically selected or designed to bring about the intended learning outcomes of any programme of study. Success of a curriculum, therefore, is not just a matter of ensuring it incorporates the required knowledge and skills; it is also dependent upon those who deliver and support this learning. It is the approaches adopted by the various stakeholders (in this enquiry the students, university tutors, laboratory training officers and laboratory managers) involved in curriculum delivery that will determine success or failure in achieving the programme's aims.

1.4 Focus and methodology of this enquiry

In redefining my focus for this enquiry I am still asking questions based upon 'how do we understand what is happening?' and 'how can we improve it? However, rather than only focusing upon my own practice I address how different stakeholders

envisage and carry out their role in the field of BMS professional practice at my own institution. An action research approach as used previously is ‘integrated action and research’ (Dick, 2012, p.399) where each cycle of the process includes both research and action. However, since my research seeks to understand the situation from the viewpoint of those within it I require a methodology that allows me to draw out both meaning and understanding of complex human experiences, whilst also addressing the influence of organisational structures and relationships on the construction of communities of practice and learning environments. Constructivist Grounded Theory (CGT), developed from pragmatist values and symbolic interactionism, provides ways of showing and theorizing how meaning and action influence each other and so has the distinctive feature of ‘providing methods to study action and process, as well as meanings’ (Charmaz, 2016, p. 42). Adoption of a CGT approach for this enquiry elicits a deeper understanding of approaches adopted by stakeholders and educes novel meanings of actions and experiences. It allows me to unpick the issues and complex layers involved in supporting the development of capability in students on an award leading to professional registration and to render recommendations for future practice. Three research questions were posed to support this enquiry:

Research Questions

1. What are the main factors that stakeholders perceive as barriers or opportunities for the current programme? (students, training officers, laboratory managers and academics)
2. How are approaches adopted for curriculum delivery influenced by these factors?

3. What is the impact of approaches adopted by stakeholders on the development of practitioner capability?

As I will discuss, the CGT approach adopted for this enquiry is closely linked to my own personal journey from quantitative researcher within a scientific setting to qualitative researcher within the field of education. Constructivist grounded theory methodology (CGTM) provides an approach to learning about the worlds we study and a method for developing theories to understand them (Charmaz, 2014, p.17). It moves beyond the 'how' and 'what' to raising and answering analytic 'why' (Charmaz, 2014, p. 228). I draw upon this methodological approach using the voices of the stakeholders to guide the research and to entice out both meaning and understanding of the current situation from the viewpoint of those within it. My approach is influenced greatly by the work of Kathy Charmaz, and in particular her classic text on developing grounded theory *Constructing Grounded Theory* (Charmaz, 2014). I also draw upon and adapt the work of others within this field as explained in Chapter Three where I discuss and defend my methodological approach.

1.5 Summary of Chapters

The thesis consists of seven chapters. This chapter provides context to the enquiry and reasoning behind the investigation, Chapter two is divided into two parts. In the first part, I introduce the reader to the 'Biomedical Scientist' as a practitioner and describe their role within the wider healthcare setting to establish why capability is an important concept in this enquiry. I provide a background to the development of the current approach to pre-registration training for the profession, review its evolution and position it within the current debate on professional education. Importantly, in

undertaking this review I identify the pedagogical approaches that have been influential in the development of the current programme. The identification of these approaches directs the second part of Chapter Two where I present my review of the literature and recent research into the theoretical concepts informing these pedagogical approaches. The literature review aids a process of orientation and provides me with sources of inspiration enabling me to become sensitised to the field of enquiry. By comparing the findings of others with my own findings I can show how they elucidate my theoretical categories and how my findings extend and challenge ideas on developing practitioner capability (Chapters Five and Six). In addition, by drawing on theories from outside of my field of enquiry I make recommendations for my own field of enquiry and for wider professional practice.

In Chapter Three I present a justification for my choice of methodology and describe how I develop my approach to data gathering and the research methods I employ. By utilising CGTM to direct my research I consider the position of individuals and groups in depth. I continually ask questions of the data and revisit previous data, comparing my coding and interpretations at each stage, drawing upon my own interpretations and current literature. Such an approach enables me to see the data with ‘new eyes’ and allows me to direct the research journey as I progress (Charmaz, 2014, p.246). I defend the methods that I use to gather data at each stage of my research journey. Although a questionnaire is not usually a method for data collection adopted by CGT, in this enquiry its role and the presentation of quantitative data to groups of scientists as a ‘tool’ for stimulating discussion is epistemologically appropriate. The disciplinary culture of those within the enquiry, positioning them firmly within the scientific paradigm, necessitates and values quantitative data in both research and practice.

An important aspect of this thesis is acknowledgment of my personal research journey as a scientist and an educational researcher. I discuss the struggles that I face as I move from a predominantly quantitative focus and positivist approach to research to a qualitative interpretive methodology. I recognise the similarities faced by the participants in my enquiry who work in a task orientated, results focused environment whilst being expected to adopt an approach to learning and teaching that acknowledges the socio-cultural aspects of professional practice and development of the reflective capable practitioner.

The process of empirical data gathering and analysis are presented in Chapter Four. By providing a visible narrative of my analytic methods and demonstrating the systematic coding and constant comparative analysis of the data, I reveal how theoretical direction is grounded within the data gathered. The chapter provides a clear narrative for the reader and supports demonstration of credibility of the enquiry; establishing the grounding of concepts and categories within the empirical data (Charmaz, 2014, p.338). I discuss how my research journey begins with a broad overview of relevant professional body documentation which allows me to position my data gathering into the current discourse on training for professional practice. The developing categories I identify from this process direct the development of a questionnaire delivered to each of the stakeholder groups. The questionnaire allows me to gather a breadth of ideas in the contemporary field of biomedical science and provides greater legitimacy as a researcher as I go into the field to conduct my enquiry. I use participants' responses to the questionnaire as a tool to direct questioning and stimulate conversations in the second stage of data gathering rather than being directed by my own preconceived ideas. As a scientist with limited experience in qualitative research this initial data gathering stage supports my

transition as well as allowing me to develop an understanding of the 'wider picture'. Adopting a two-stage data gathering approach is significant since it provides 'stopping points' and supports my journey from a positivist quantitative researcher to a qualitative reflexive researcher within an interpretive paradigm.

The second stage of data gathering is grounded in the first since it draws upon the initial developing categories to guide further data collection. Excavation of the initial coding and developing categories generated from the first stage enables these to be understood in the context of individuals' daily lives, identifying taken for granted assumptions and preconceptions. The second stage of data gathering consists of focus groups with training officers, laboratory managers, academics and students, and interviews with individuals from each of these stakeholder groups. I consider the developing categories and key concepts from the first stage in greater detail through the use of initial, focused and theoretical coding to provide an in-depth analysis and theoretical direction for my enquiry.

In Chapter Five I present the construction of the theoretical categories. I draw upon the theoretical frameworks identified in my literature review to assist in analysing and interpreting my data from within the current discourses. This approach enables me to extend existing ideas on work-based practice and development of practitioner capability.

Chapter Six provides a synthesis of the main findings presented in the previous chapter in relation to the research questions directed by the empirical findings and my interpretations. The dominant theories of learning and teaching within practitioner education enable me to theorise the current experiences and practicalities of integrating professional registration for BMS into an academic programme.

In the final chapter, Chapter Seven, I focus upon the outcome of my enquiry. Drawing upon Charmaz's (2014, p338) criteria for evaluation of a study I address each of her four criteria: credibility, originality, resonance and usefulness. In presenting this I make clear the theoretical value of my findings and their contribution to the field of enquiry as well as discussing the enquiry's limitations. I reflect upon my own personal journey and provide recommendations for future practice.

Chapter Two – Background to Biomedical Science Profession and Literature Review

This chapter is divided into two parts to provide an introduction to the field of professional practice in which this enquiry is positioned followed by a review of recent research relevant to the focus of this enquiry.

Part one introduces the field of biomedical science to the reader and provides an overview of the background for the development of pre-registration training. These developments are aligned to changes in government and professional body requirements and reflect the trends in pedagogic delivery of professional education. Four main pedagogical concepts are identified as influential in the development of this programme of practitioner training: workplace learning, reflective practice, standards based frameworks, and capability approach

In part two I review recent research into these four areas to provide a foundation for the development of my grounded theory. Identifying and critiquing the most significant ideas and findings enables me to make connections between my own research and the studies of others and so frame and integrate these into my own findings in Chapters Five and Six.

2.1 Part One - The Biomedical Scientist and pre-registration training

Biomedical scientists (BMSs) carry out a range of laboratory and scientific tests that are essential in supporting the diagnosis, treatment and development of patient care pathways. Most biomedical scientists work in pathology laboratories in the National Health Service (NHS). Success in modern healthcare relies on the accuracy and

efficiency of work by biomedical scientists since patients' lives and the treatment of illness depend on their skill and knowledge (NHS Careers, 2013). In recent decades there have been dramatic changes in the organisation, number and type of tests performed by BMSs in clinical laboratories. This has led to changes in the roles of the BMS which call for greater analytical accuracy, more stringent test selection and interpretation of results (Plebani, 2002). Biomedical scientists in the NHS must be registered with the Health and Care Professions Council (HCPC) to allow them to practise in this role. Registration is achieved through achievement of an accredited honours degree in biomedical science and a period of in-service training in a laboratory setting. During this pre-registration period individuals are required to evidence acquisition of competence against defined standards of proficiency (HCPC, 2014).

2.1.1 Current programme content and delivery for BMSs

As outlined, the programme of study for biomedical science is underpinned by the HCPC standards that are designed to ensure the safe and efficient practice of biomedical scientists (HCPC, 2014). Curriculum content is also directed by the requirements of the individual professional and regulatory bodies. For Biomedical Science these are produced by the Institute of Biomedical Science (IBMS, 2016) and the Quality Assurance Agency Benchmarks (QAA, 2007). An emphasis is placed upon development of understanding in defined areas of knowledge in the academic portion of the award and achievement against a prescribed set of standards during work based training to ensure the development of an individual able to practise safely and effectively (HCPC, 2014, p.3).

2.1.2 Development of current BMS programme

Historically, practical laboratory training was mainly in-house and largely unregulated. The local variation in the education and competence of staff and service that existed prompted the introduction of State Registration with the Council for Professions Supplementary to Medicine (CPSM) via the Professions Supplementary to Medicine Act, 1960:

> An Act to provide for the establishment of a Council, boards and disciplinary committees for certain professions supplementary to medicine; to provide for the registration of members of those professions, for regulating their professional education and professional conduct and for cancelling registration in cases of misconduct; and for purposes connected with the matters aforesaid (Professions Supplementary to Medicine Act, 1960**).**

The CPSM formed in 1960 with a role of supervising the activities of the boards established to represent each of the health professions that they regulated: biomedical science being one of those professions (previously Medical Laboratory Scientific officer, MLSO). The CPSM not only acted as a register for health professionals but also monitored educational requirements for entry into the profession and the professional behaviour of registrants. The CPSM standardised the criteria required to be recognised as a trained professional via a 'logbook and viva' route. In-house training consisted of a trainee undertaking training in each of the sections identified in the log book. Completion of these activities or techniques resulted in these sections being signed as achieved by the trainer. Trainees were then required to pass a viva which was an oral examination with one internal assessor, usually a senior member of the department that the trainee was employed in, and an external assessor, a professional peer appointed by the CPSM.

2.1.3 New Labour and Introduction of Quality Standards in the NHS

In the late 1990s when New Labour came to power, several reforms were introduced in the NHS which had a major impact upon the workforce structure and delivery of training. In December 1997, *The New NHS, - Modern. Dependable* (DOH, 1997) was issued. This paper outlined a change in focus in the NHS with quality of care and achievement of standards being moved into the spotlight. There was recognition of the variation in both service delivery in various sectors of the NHS and training in the health professions:

> Integrated care for patients will rely on models of training and education that give staff a clear understanding of how their own roles fit with those of others within both the health and social care professions (DOH, 1997, section 6.10).

The paper discusses the need to introduce a more integrated approach to both service delivery and the training and support for those delivering services. The paper was followed by a consultation document - *A First Class Service: Quality in the new NHS* (1998) which set out an extensive agenda for change. This agenda focused upon improving quality standards, efficiency, openness and accountability in the NHS through the implementation of national frameworks and standards:

> Setting standards, delivering standards, monitoring standards – these are the routes to consistent, prompt, high quality services throughout the NHS….For the first time in the history of the NHS standards will be set for how services should be delivered (DOH, 1998, section 1.18).

It was believed that to achieve a high standard of service delivery there was a need to set standards; standards would provide a benchmark against which services could be evaluated as well as being a means to raise quality. *The NHS Plan: A Plan for Investment. A Plan for Reform* (DOH, 2000) was issued two years later and outlined a redesign of the NHS with standards based around the needs of the patient:

> From its creation in 1948 there were no national NHS standards. The assumption was that standards would rise automatically in all parts of the country (DOH, 2000, p.30).

Standards setting was viewed as a means of driving improvements in the quality of service delivery. Within the plan there was a recommendation that similar principles implemented for nurse training would be applied to education and training for the other health professions and health care scientists (DOH, 2000, p.85). These changes relate to *Making a Difference* (DOH, 1999) which emphasises improving access and developing practical skills at an earlier stage in the practitioners training. Importantly, it highlights the requirement for stronger links between universities and the NHS. From this the drive to integrate work based learning into professional courses was established as an essential approach to developing and sustaining a quality service through supporting development of practitioner capability.

Much of the agenda for reform in workforce development was set out in these various strategy documents and in the NHS Plan. The demands upon the NHS and on the workforce delivering patient care were acknowledged as changing, meaning that a skilled, flexible and productive workforce was needed to address these changes. Laboratory investigations were initially performed to confirm a medic's diagnosis of a patient. Now, approximately 70% of medical decisions or interventions, from diagnoses to monitoring medical treatments are based on the activities of biomedical scientists or require the knowledge and skills of biomedical science (Glencross, Ahmed and Wang, 2016, p.1). Therefore, the training and development of this workforce needs to reflect these extended roles and emphasises the role of the capable practitioner.

2.1.4 Professional Competence and Accountability

The reforms and developmental changes introduced by the government throughout the 1990s focused upon pre-registration education as providing the basis for professional capability and entry onto the professional register and highlighted the requirement for delivery to be addressed. The need for change was also given added impetus by adverse events and incidents in healthcare provision, raising the importance of professional competence and accountability in the public consciousness (Bristol Royal Infirmary Inquiry, 2001):

> Acquiring and maintaining professional competence involves collaboration between the individual, the educational institutions, the employer, and those who set and enforce standards of professional competence. Individual healthcare professionals, once qualified, need to be sufficiently motivated and have sufficient incentive to maintain and develop their competence (The Bristol Royal Infirmary Inquiry, 2001 Chap 25: section 6).

The inquiry into incidents at Bristol Royal Infirmary led to acknowledgment of a need for change. This in turn led to the proposal of profession specific and shared benchmark statements to underpin service delivery. These benchmark statements addressed the knowledge, skills and expectations of the range of healthcare practitioners entering the professional register (DOH, 2001a). As part of these recommendations, the Council for Professions Supplementary to Medicine (CPSM) was replaced by the Health Professions Council (HPC) on 1 April 2002, which became the Health and Care Professions Council (HCPC) on 1 August 2012.

2.1.5 Professional Benchmarks

One of the main functions of the CPSM (now HCPC) in this new framework was to establish standards of proficiency necessary for registration, and to ensure maintenance of professional competence. The role of issuing an evidence-based

Registration Training Portfolio, which replaced the 'log-book', was taken on by the professional body representing biomedical scientists – the *Institute of Biomedical Science* (IBMS). In addition, the IBMS also became responsible for the approval of laboratories for training, the issuing of 'Certificates of Competence' for registration, and the assessment of qualifications for entry onto pre-registration training (IBMS, 2017a). The registration training portfolio articulates the standards of proficiency set by the HCPC. These are the standards that every registrant must be able to demonstrate to become registered, and must continue to demonstrate in order to maintain their registration (HCPC, 2014). Successful verification of achieving these standards of proficiency results in the awarding of the 'Certificate of Competence' by the IBMS. The HCPC accept this as evidence that the individual has met the standards of proficiency and is therefore 'fit to practise' as a biomedical scientist (IBMS, 2017b). The standards were first published in 2003 when the HCPC register opened. A review was undertaken in 2005 and a revised edition was published in 2007 resulting in an updated version of the Registration Training Portfolio being published by the IBMS in 2008 and again in 2012 to reflect the name change of the HCPC. Version 2 of the third edition was produced in 2013 (IBMS, 2013). A review of standards occurred during 2014 and these were updated towards the end of the year (HCPC, 2014) to reflect relevant changes in practice. The HCPC standards of proficiency include both generic elements, which apply to all registrants, and profession-specific elements which relate to the knowledge and skills required to practise as a BMS. The portfolio provides:

> ..the framework for education and training in order for biomedical scientists to demonstrate their fitness to practice through evidence of competence that the standards of proficiency have been met (IBMS, 2013, p.15).

The evidence-based standards introduced by the HCPC have become the central mechanism for articulating the expected level of practice and knowledge for a BMS. As a result the focus of the current approach to practitioner development for BMSs is based upon the central role of competency based training which is tasked with driving improvements in the workforce and to ensure standards of practice are maintained. In addition, entry to the role of a Biomedical Scientist, like many other professions, requires completion of an 'accredited degree'. *Making the Change: A Strategy for the Professions in Healthcare Science* outlines that the curriculum requirements for these degree programmes 'include a major focus on competence with skills training mapped onto the National Occupational Standards Framework for Healthcare Science' (DOH, 2001b, p.26). Therefore, the curriculum developed for biomedical scientist training has been greatly influenced and directed by the proposals made in these government papers (DOH, 1999; DOH, 2000; DOH, 2001b) which stress the need for a 'greater emphasis on validated academic outcomes and on ensuring competence' (DOH, 2001b, p.22). This highlights the emphasis placed by policy makers on not just 'knowing' but also 'doing' as a requirement for practice.

2.1.6 Modernising Agenda – Capable and Reflective Practitioners

The modernising agenda introduced into the NHS in 2008 recognised the changing pressures upon the NHS workforce resulting from advances in technology and healthcare provision, identifying the need to develop practitioner capability and embedding support in the delivery of practitioner education. *Modernising Scientific Careers* was introduced as an initiative to ensure that training for the healthcare science professions delivers a consistent and patient focused programme engaging trainees in workplace experiences coupled with academic learning (Darzi, 2008a,

p.71). *NHS Next Stage Review: A High Quality Workforce* (Darzi, 2008b, p.12-13) recognised the essential role of work based learning in achieving this approach. Learning emerges from taking part in the workplace, linking theories and knowledge with practice and experience. These are then supported by conscious reflection upon actual work experiences:

> …..enhancing the capabilities and capacity of the scientific workforce to ensure that they respond to advances in science, changes to the technological landscape and developments in care pathways (*Darzi, 2008b,* p27).

Reflection and reflective practice are, therefore, identified in Darzi's review as an essential component of the workplace experience to support the development of the capable workforce and so ensure a high standard of care delivery for patients. *'Liberating the NHS: Developing the Healthcare Workforce, From Design to Delivery* (DOH, 2012) provides guidance for planning and commissioning education and training in light of Darzi's recommendations. It sets out direction for developing the healthcare workforce by ensuring the integration of capacity and capability into this workforce.

2.1.7 BMS Curriculum Delivery

Delivery of the BMS curriculum varies between higher education institutions with topic areas delivered through a variety of modules and approaches during the taught programme. However, for the work based component of the programme, the standards based framework directs the placement learning in all NHS pathology laboratories. A portfolio of evidence is gathered by the student to demonstrate their achievement against each standard. Tasks are broken down into observable portions and an 'objective observer' evaluates performance. Progression in competence occurs from 'novice' to 'competent practitioner' based upon the

assessment of these skills in the workplace setting by the trainees' supervisor or training officer, and completion of the registration portfolio. In addition to in-house assessment of competence, portfolios are also subject to external verification by a biomedical scientist with a minimum of four years post registration experience and who has attended a 'verification training day' (IBMS, 2017c). Their role is to verify that the evidence provided by a candidate as part of their training and fitness to practise assessment in the workplace demonstrates competence against the 'Standards of Proficiency' set down by the HCPC (HCPC, 2014). In addition, the verifier considers the suitability of a laboratory for approval for pre-registration training.

> Evidence of achievement is based on observations and questions set by the trainer or individual pieces of work related to knowledge and competence statements for each Standard of Proficiency (IBMS, 2013, p.17).

The verifier, therefore, ensures that the range of evidence gathered by the student for their portfolio is sufficient and appropriate to demonstrate that adequate training, support and assessment have occurred during the work based period of training. It is the role of the training officer who supports the student in the workplace to ultimately assess the student's suitability for entry onto the register. This assessment is based upon the student demonstrating they have achieved against this set of standards currently packaged into the Registration Training Portfolio.

2.1.8 Summary

Biomedical Science represents an area of healthcare that has constantly undergone major changes resulting from rapid advances in technology and breakthroughs in diagnostic medicine. In recent decades there have been dramatic changes in the organisation, number and type of tests performed by BMSs in clinical laboratories.

This has led to changes in the role of the BMS which call for greater analytical accuracy, more stringent test selection and interpretation of results (Plebani, 2002). In addition, the NHS has continued to undergo major changes and reconfiguration of the workforce driven by both patient needs and new technology. The expectations placed upon those working in this field continue to evolve (NHS Confederation, 2013). The essential role of HEIs in supporting the rapidly developing role of the healthcare professions, supporting development of the workforce and in enhancing the capabilities and capacity of the scientific workforce has been recognised by the Department of Health (DOH, 2001b; Darzi, 2008b). The result is that work based learning is recognised as an essential component of higher education programmes which lead to a professional qualification. Their aim is to ensure knowledge development is integrated into practice. This changing context for HEI awards in supporting the development of professional practice is an important element in my enquiry.

Alongside this move towards integration of work based placements into programmes of higher education for health professionals an additional influence which has also been seen in other sectors such as education and teacher training, has been the ‘competence movement’ in the UK in the 1980s and 1990s (Bates, 1995). Reforms introduced by New Labour in the late 1990s established a standards based approach to training and assessment of health professionals (DOH, 2000). Reflection on practice was articulated in their policies as an essential component of this approach to ensure that the required outcomes of each standard are met by individual practitioners.

Overall, four key themes can be identified as influencing the current approach to the BMS programme for registration of practitioners and these are presented in figure 2.1 below:

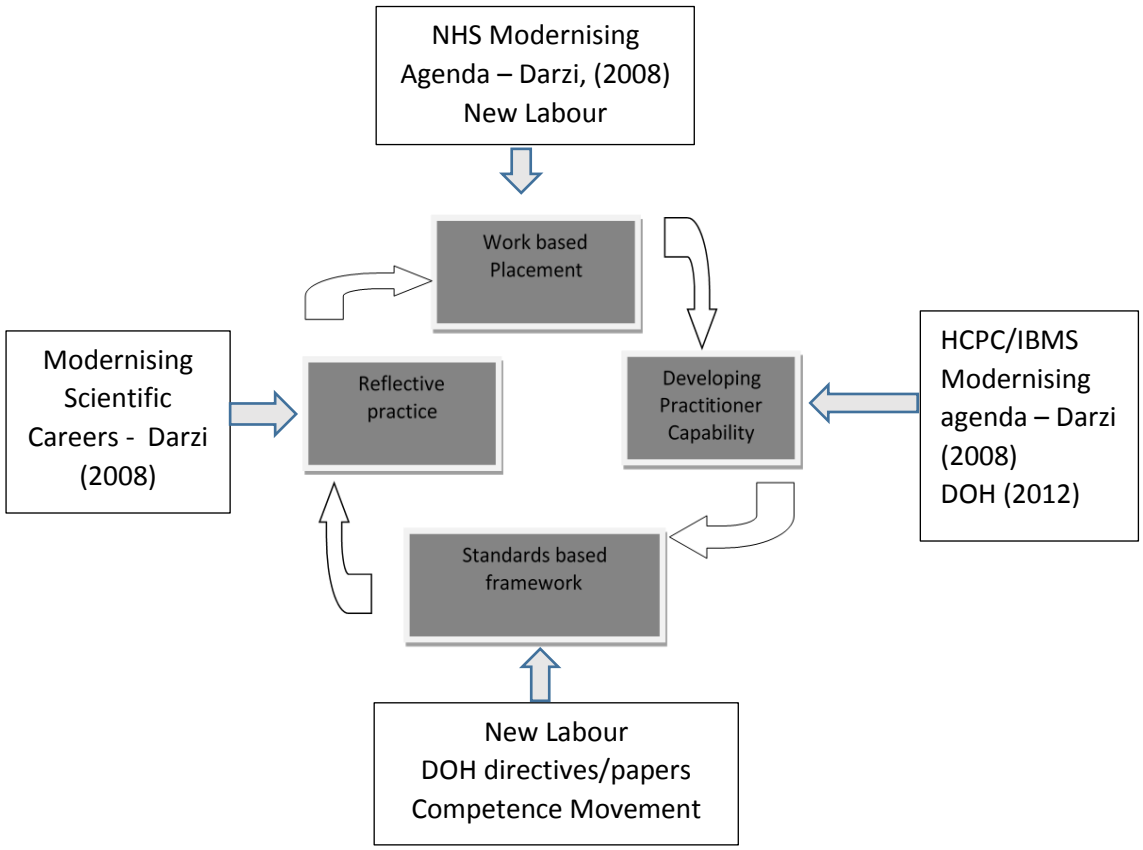


Figure 2.1. Key themes in BMS programme development

2.2 Part Two - Review of literature on practitioner education

In this section I provide a review of the literature on practitioner education and identify relevant research and key theories in the four main areas identified in part one as guiding the development of the current BMS programme of education. My aim in undertaking a literature review is to foster a greater understanding of current theories and concepts to enhance my own sensitivity to the research focus. In addition, the literature becomes 'data itself' allowing me to make constant comparison with empirical data collected through my own research journey and so aids me to develop theory from my own research.

2.2.1 Role of the Literature review in Constructivist Grounded Theory

Thornberg (2012) argues for the role of a literature review in grounded theory methodology enquiries to be one which opens up the research areas and supports the researcher to interpret and position their own findings within the current research conversations. It allows multiple conversations to take place linking all aspects of the research; researcher, literature, data and emerging ideas. I reflect upon and utilise this initial review to provide a valuable source of comparison to support data analysis and interpretations in Chapter Five and to aid the synthesis of findings to address the research questions presented in Chapter Six.

The aim of the BSc Biomedical Science programme is defined in the literature produced by the professional body as providing the in-depth scientific knowledge required for the role and the training for entry into the profession: 'ensuring an individual's competence for patient safety' (IBMS, 2016, p.4). Within the literature produced by the professional and regulatory bodies the terms capability and competence are used interchangeably to define expectations of a practitioner along

with the need for reflective practice. I, therefore, start by looking at definitions of these within the literature before addressing current theories of learning and the wider literature on workplace learning and practitioner education.

2.2.2 The Capable practitioner

I start by addressing the definitions provided in the literature around capability and the capable practitioner to establish why it is an important concept in this enquiry and an essential learning outcome in the healthcare professions (Darzi, 2008b, p27). The concept of capability emerged from the UK in the mid-1980s as the need for a more competitive workforce, able to adapt to rapid changes, was acknowledged (Hase and Davis, 1999). The subsequent changes seen in approaches to supporting learning and guidance within government directives are anchored firmly in the neoliberal policy making agenda of the Labour Party during the 1990s, and as a response to globalisation (Olssen and Peters, 2005). The aim of the capability movement was to break down the dichotomy between training and education by embracing the perceptions of education and training within a practical approach to learning that addressed the wider picture (Stephenson, 1994). Capability is seen as an essential learning outcome that supports professionals to integrate enquiry and evidence into practice enhancement and professional development (Garrick and Usher, 2000). This contrasts with ‘training’ which often presumes that there is an answer - a problem that can be solved. Training focuses upon routine procedures and the development of specific skills; to ‘doing’ rather than ‘being’. As a consequence, it does not tackle either the emotional, structural, social or political environment of the workplace (Bryans and Smith, 2000). This is an important concept and I will return to it later when I discuss the dominant theories of learning in practitioner education.

The term capability can be found ‘scattered’ within policies, integrated into job profiles and careers information throughout all areas of the NHS. Health Education England (HEE) was established following publication of *Liberating the NHS: Developing the Healthcare Workforce, From Design to Delivery* (DOH, 2012) outlining a new system for planning and commissioning education and training. Developing the healthcare workforce by building capacity and capability is a key role of this group. The Education Outcomes Framework (EOF) presented in the policy document links education and learning to improvements in patient care and health outcomes.

However, although seen as an essential requirement for the NHS workforce, only vague definitions of capability are articulated in their various publications. The definition provided for domain two of this policy, ‘Competent and Capable' staff is:

> There are sufficient health staff educated and trained, aligned to service and changing care needs, to ensure that people are cared for by staff who are properly inducted, trained and qualified, who have the required knowledge and skills to do the jobs service needs, whilst working effectively in a team (DOH, 2012, p.7).

This definition is unclear and provides little guidance on how capability development should be promoted and supported in the workforce. I, therefore, draw mainly upon research into teacher education, medical and nursing education for definitions of capability and approaches to supporting and developing the capable practitioner.

The precise definition and perception of a capable practitioner may vary between individuals, dependent upon their own background, experience, education and profession. My own perception of capability as a practitioner myself, is a person who not only knows about their specialism but also has the confidence to apply their knowledge and skills in varied and changing situations, whilst continuing to develop

their specialist knowledge and skills (Stephenson, 1998, p.3). In addition, personal skills are also involved, with the individual having the capacity to work as part of a team (Phelps and Hase, 2002): an essential skill in biomedical science where individuals work in multidisciplinary teams. For effective functioning in complex and demanding workplaces there is a need for individuals to perform in unknown contexts and the ability to do this extends beyond just knowledge and skills (Hase and Kenyon, 2007). A capable person is more able to 'respond to the demands of a rapidly changing and ambiguous environment' (Hase and Davis, 1999, p.298) if they have the ability to apply their knowledge to a range of settings.

Such definitions provide an insight as to why capability is perceived as so important by organisations such as the National Health Service. The move within Higher Education Institutions (HEIs) to widening participation and the purported association between education and economic competitiveness have increased the focus on their role in preparation of the student for employment and embedding capability development within programmes of study. There is an abundance of research that supports the value of a capability approach to learning and its value in developing practitioners (Cairns, 1999; Fraser and Greenhalgh, 2001; Gardner et al., 2008; Hase, 2000; Phelps, 2002). As highlighted, 'competence' and 'capability' have become part of this changed discourse on HEIs and their role in preparing individuals for the world of work (Holmes, 1999, p.84; Browne, 2010, p.14). The challenge for those involved in professional education is to be able to move beyond considerations of knowledge and competence to develop programmes that support the development and assessment of capability for practice. However, the terms competence and capability are used interchangeably in the literature with competence and competence frameworks featuring extensively in discussions on

practitioner training and capability in the professions allied to medicine (Morcke, Dorman and Eika, 2013). I, therefore, attempt to unpick the discourse around the two terms further to use current understandings to support my own enquiry.

2.2.3 Competence vs. Capability

Competence is often defined as being about fitness for specified purposes (Stephenson, 1998, p.3). It relates to proven ability to operate within certain environments. Competence can be assessed; the individual is either able to perform a specific technique or is not able to perform it. The central assumption of the competency based approach to learning is that an occupation can be broken down into smaller elements of defined knowledge and skills (competencies), and that achievement of an accepted level of competence in each of these domains will lead to overall proficiency and capability (Brightwell and Grant, 2013). However, studies suggest that a competence focused approach results in the adoption of assessments that measure only factual recall and are inadequate measures of the individuals' knowledge and capability since it is the ability to effectively apply knowledge and understanding within the workplace that provide such evidence (Epstein and Hundert, 2002; Watson *et al*., 2002). A competence focus can be seen to reflect a convergent approach to learning, evidencing that extant objectives have been achieved rather than a divergent approach which is orientated towards what individuals can do in a range of settings (Torrance, 2007). The ability to perform a specific task does not imply an understanding of the process or that anything significant is learnt whilst performing the task (Halliday, 2004). This is particularly pertinent to my own research since practitioners need to not just be able to perform a task but to also make decisions, understand the wider process and critically evaluate

what is required (Mitchell, 1989, p.63) by being able to apply knowledge to a wide range of varied environments within pathology.

Olssen and Peters (2005, p.313) take the debate on competence vs. capability further and suggest that on awards linked to professional practice and the development of ‘skills for the workplace’ the focus upon economic competitiveness and preparation of students for employment has led to the conventional professional values of ‘open intellectual enquiry and debate’ being gradually superseded by this emphasis within institutions upon performativity, evidenced by the focus upon measurement of outputs. Tedesco-Schneck (2013) highlights how within the healthcare setting, practice has become modelled by directives and guidance from governmental and professional bodies similar to those discussed in part one of this chapter. With relevance to my own research, they suggest that when this focus is transferred to the educational setting, the development of standards for practice has brought about the adoption of an evidence-based approach which results in ‘measurable competencies positioned in the tradition of a patriarchal, positivist paradigm’. This approach which focuses upon demonstration of competence is seen to favour a ‘passive pedagogy’ and ignores the socio-cultural aspects of learning (Tedesco-Schneck, 2013 p.59). Interestingly, Tedesco-Schneck suggests that the focus upon competencies as being measurable, behavioural outcomes is driven by a subconscious need to align with this ‘esteemed positivist paradigm of medicine’ (2013, p59) and so drives this outcomes approach. This alignment of practitioners may be reflected within the BMS programme and links to my aim of understanding the positioning of the stakeholders.

Research into professional practice acknowledges that an approach that focuses upon capability rather than competence alone is more appropriate to support the development of practitioners (Garner *et al*., 2008: Lester and Costley, 2010). The ability to know how to learn and apply this learning in a range of environments is a more powerful indicator of a practitioner's ability than the simple technical knowledge that is required for competence (Phelps, Hase and Ellis, 2005). A capability approach allows the individual to evolve in their role and practise within the scope of their profession with ongoing development and progressing of skills into more advanced and refined practice (Hase and Kenyon, 2001).

Competence and capability should not be viewed as mutually exclusive abilities. Studies have suggested that if delivered appropriately, an approach that is competence-focused can extend to support the development of both a competent and capable practitioner (Epstein and Hundert, 2002; Leung, 2002; Morcke, Dornan and Eika, 2013). However, if a competence-based approach is applied inappropriately, with a narrow performative focus, it can result in the de-motivation of the trainee and will not address all aspects of professional training. When delivery is underpinned by behaviourist ideology then the 3Rs label (Reductionist, Restrictive and Ritualistic) (Bathmaker and Stoker, 1999, p.55) often applied to the competence based approach becomes appropriate. Training will focus upon the acquisition of minimum acceptable standards within each area and a reduction in the educational content will result from focusing merely on specific defined areas (Leung, 2002). The role of the workplace then becomes seen as the acquisition of skills and knowledge (training) rather than developing performance of the individual in the workplace (learning).

The significance of embracing a capability approach rather than a narrow competence-based approach is central to my enquiry when reviewing the role of the BMS. The working environment of the BMS has undergone rapid changes in practice and major developments in technology over the past two decades. This, coupled with a range of service reconfigurations in the past twenty years has impacted upon both the role and expectations of the biomedical scientist:

> Historically, pathology has been at the forefront of change in many areas of medicine and science; now the challenge is to deliver care to patients in new ways and new settings, building on technological and scientific developments and working with a plurality of providers (DOH, 2004, section 1.19).

This statement emphasises how the role of the BMS is not one of performing tests in set ways. To practise effectively in such a changing and often complex environment, a biomedical scientist needs to develop the ability to self-manage their learning potential; to understand the processes and strategies needed to implement self-managed learning (Gardner *et al*., 2008). In a workplace where change is so rapid, the traditional methods of training and education have become inadequate; discipline based knowledge on its own is inappropriate to prepare for modern workplaces (Davis and Hase, 2001). The Dearing report made recommendations on how the 'purpose, shape, structure, size and funding of higher education….should develop to meet the needs of the United Kingdom over the next 20 years' (Dearing, 1997, p1). It proposed giving students a greater responsibility in managing their own learning; developing a capability based education. Within the health professions, developing capability in practitioners aims to ensure that delivery of healthcare keeps up with the ever-changing contexts. As such, education providers are required to offer an environment and curriculum that enables the individual to 'develop sustainable abilities appropriate for continuously evolving organisations' (Fraser and Greenhalgh,

2001, p.799). This is of great relevance to my enquiry since I wish to establish whether this is being achieved within the current programme.

Bringing together the range of definitions, capability can be seen to draw on the work of Schön and his concept of 'professional artistry' (Schön, 2001, p.200) – preparing students to apply their knowledge in unfamiliar settings. It involves individuals bringing together their knowledge and skills, including personal attributes, to effectively respond to and tackle a range of circumstances, both known and unknown (Carryer *et al.*, 2007). The ability of individuals to adopt this approach to practice is essential for complex and rapidly changing environments such as the healthcare setting. Reflection and development of the reflective practitioner are terms used within the healthcare literature to address this need to bring together knowledge and skills from different settings (Darzi, 2008b, p.27).

2.2.4 Reflective practice

Within the literature on practitioner education I identified that reflection and the reflective practitioner are dominant themes in studies. Schön (1983, p.50) stressed the notion of reflection as central to professional practice. His work led to substantial research and literature into the role and value of reflective practice: leading to the proposal that active engagement in practice is not sufficient to develop as a practitioner, reflection is required to transform this experience into learning and to negotiate the uncertain, ambiguous and often contradictory experiences encountered within practice (Boud, Keogh and Walker, 1996, p.7). The transition from student to practitioner is not so much about the acquisition or development of specific knowledge and skills but rather developing the skills needed to reflect constructively upon experiences as a way of developing the knowledge and skills required to

practise and improve the effectiveness of practice (Moore, 2000). Curriculum design and delivery both need to support the development of a reflective approach, not just during work based experience, but throughout the entire programme of study. The development of an approach that not only recognises this but also delivers is central to the aims of my enquiry and so emphasises the importance of reflective practice as a concept.

To develop my understanding of how different theories of learning relate to practitioner education I next address these to develop sensitisation to support later interpretation and analysis of the empirical data gathered during this enquiry.

2.2.5 Theories of learning and the practitioner

Cairns and Malloch (2013, p.8) suggest that 'we all 'know' what we mean when we use the term 'learning' but there are variations and aspects that require comment and debate. As I highlighted previously, education forms part of the equation of learning and learning theories. A binary of education and training has developed within this concept. Education embraces exploring 'new ways of being' and extending whereas training is more specific and bounded, 'targeted at competence in a specific practice' (Wenger, 1998, p.263).

The dominant theories in the literature on practitioner learning are constructivist and sociocultural theories (Evans *et al.*, 2006, p.11). A diverse range of empirical studies which draw upon these two approaches exist focusing upon learning and practitioner development; learning as a process parallel to and embedded in practice (Lester, 1995), learning through involvement, communication and decision making (Hase and

Davis, 1999), capability development via practitioner action research (James and Mulcahy, 2000), development of 'constitutive understandings' allowing both practical and theoretical capabilities to develop (Lum, 2003). An important aspect is that all highlight that an environment, both social and physical, that promotes deep learning (Ramsden, 2003, p43) and encourages students to learn via active involvement is more likely to support adaptive capability; helping students to question the assumptions that inform their capability (Lizzio and Wilson, 2004). Lave and Wenger's discussion of legitimate peripheral participation is an important concept for my research. They emphasise knowing as an activity by people with the construction of identities and relationships within specific circumstances (Lave and Wenger, 1991, p.52). Learning occurs through mutual engagement in an activity, located in an evolving network of relations focusing on activities and knowing rather than outcomes. This emphasis upon the roles of individuals in supporting learning in 'real-life' situations is important for my enquiry since I focus upon understanding the positioning of stakeholders on the current programme and identification of barriers to building supportive and appropriate communities of practice. Networks involving supportive feedback with tutors making an effort to understand the issues students encounter to enable them to provide clear explanations are seen as essential (Trigwell, Prosser and Waterhouse, 1999). In addition, social interactions between an individual and their colleagues is shown to impact on the development of capability since a capable practitioner is one who can establish good working relationships (Hase and Davis, 1999). The research emphasises that learning is situated in everyday social contexts and that learning involves changes in participation in communities, rather than the individual acquisition of abstract concepts separate from interaction and experience (Lave and Wenger, 1991;

Engestrom, 1996). This perception of learning as situated within and participating in a ‘community of practice’ (Lave and Wenger, 1991, p.64) supports the move to integrating work placements into professional programmes and highlights the role of stakeholders in such communities of practice in supporting and developing the learning environment. It is in contrast to behaviourist and cognitive theories which focus on the individual as a learner and reflect the competence based approach discussed earlier.

Engestrom (1996) suggests that standard theories of learning focus on processes and he suggests that individuals and organisations are constantly involved in learning that is ‘not stable, not even defined or understood ahead of time’ (Engestrom, 2001, p.137). Engestrom (1996, p128) suggests that traditional developmental theories are about progress, about ‘climbing upward on some developmental ladders’. This approach to learning through a hierarchy of knowledge and skills, normally occurring through formal study (Beach, 1999) is evident in the current structure of degree programmes. In contrast, horizontal development which relates to the process of change and development within an individual when they move from one context to another, from university to the workplace or between two different workplace settings is rarely addressed. Horizontal learning acknowledges that learners need to be able to interrogate their learning in all situations and Guile and Griffiths (2001) suggest that the tendency to treat vertical and horizontal development in isolation reflects what they refer to as the institutional separation of formal from informal learning. They acknowledge that it is this dichotomy that informs the basis of much debate around workplace learning and so focuses my own enquiry to address how learning in different locations is viewed and perceptions of both formal and informal learning. However, Eraut (2007) highlights that the problem goes

deeper than a focus upon formal or informal learning. He suggests that students need to be able to identify the learning experiences that they are being exposed to on both a personal and social level. It is this ability that informs and develops their professional practice (Eraut, 2007). In addition, those supporting workplace learning must also appreciate how learning occurs in such an environment and how best to support the development of the capable practitioner to ensure learning occurs. Development of capability should be supported by the teacher and not be dependent upon the teacher. The concept of learning environments is taken further by embracing the concept of connectivity as essential for ensuring learning occurs within the workplace (Griiffiths and Guile, 2003), whilst the process of 'expansive learning' is also suggested as essential (Engeström, 2001; Fuller and Unwin, 2003). An expansive learning environment recognises the importance of the current and changing economic climate in directing learning. The BMS profession that I am researching has undergone and is still responding to a range of influences that impact upon practice and service delivery. I need to ensure that my enquiry embraces and draws upon these concepts to recognise the wider context in which the programme and stakeholders are situated. These concepts reinforce the focus in my research to develop a greater understanding of the perceptions and attitudes to both learning and the delivery of learning by all those involved in the current programme to enable me to answer the 'why' questions about practice in addition to the 'how' and 'what'.

A vast amount of research has been undertaken to address the role of work based learning in practitioner education as well as the role of the tutor and the workplace environment itself. The focus of each of these is relevant to my own research aim

and so I address each in turn below to support my understanding of contextual variables and current theoretical claims. I start by looking at why work based learning is perceived as an essential component of practitioner education.

2.2.6 Work based learning and Practitioner Capability

Work based learning has been reported as being essential for successful practitioner development especially in the healthcare profession: merging theory with practice and knowledge with experience (Dearing, 1997; Leitch, 2006; Darzi, 2008b). In 1997 the National Committee of Inquiry into Higher Education (Dearing, 1997) questioned a classroom-based approach for the delivery of programmes aimed at supporting development of practitioners and sustained changes in practice. The need for alternative forms of education which were more responsive to the skills and knowledge required by practitioners was highlighted. In 2006, the Leitch Review of Skills (Leitch, 2006) emphasised the need for supporting skills development at all levels in the workforce. Of specific interest was the focus in the report on supporting the delivery of more integrated awards incorporating work based learning provision (Leitch, 2006, Chap. 4). The approach recommended by the report recognises the on-going and continuous changes in the modern workplace and identified the need for adaptable and flexible approaches to learning. Emerging from this recognised need to move away from the traditional pedagogic delivery are awards that incorporate work based practice as an essential component.

Higher education programmes are about more than learning for work or a specific workplace. However, such learning is now an important part of the aims and objectives of many programmes of study. These programmes cover a range of disciplines and workplaces with the focus being on the development of practitioners

able to function efficiently in the workplace (Webster-Wright, 2009). A growing number of all undergraduate awards now relate to professional and vocational studies with many, like the BSc Biomedical Science award, being closely linked to professional requirements and standards (Brennan and Little, 1996).

A review of reports into the delivery and effectiveness of these higher education courses identifies a move away from the more traditional approach to delivery of awards towards ones where work based learning is a recognised and essential component (Foster and Stephenson, 1998). This move has been driven in part by the recognition that the academic skills that are developed through conventional higher education programmes are not necessarily those that are required within the workplace (Boud and Solomon, 2001, p.27).

As previously highlighted, work based learning is not just about learning to do a job (training): it is also about personal development and the acquisition of knowledge and skills that transcend particular settings or roles (Brennan and Little, 2006, p.12). Such an assertion suggests that work based learning enhances the employability of the student. Employers desire a graduate who can quickly adapt to the workplace culture, use their abilities and skills to support the development of the workplace and use higher-level skills to facilitate innovative teamwork (Harvey *et al*., 1997). This resonates with the development of my enquiry to address why employers perceive that students graduating from the programme do not possess the expected skills and abilities of a registered practitioner. Aitkins (1999), however, cautions against the many assumptions made around the role of higher education, the development of key employability skills for graduates and the resulting expectations of employers. This provides me with the sensitising concept around definitions of employability

skills and what is expected of a newly qualified practitioner. I next look at the role of the tutors who support practitioner education to address how they support the development of knowledge and skills required by the new practitioner.

2.2.7 The Tutor and Practitioner Capability

The need to ensure that time and support are provided for work based tutors and lecturers who are involved in the delivery of professional programmes is identified as essential (Flanagan, Baldwin and Clarke, 2000). Support should consider initiatives and trends in both the profession and pedagogy of workplace learning. Many studies, especially on professional programmes focus upon the learner; highlighting 'improved student learning', the student's approach to learning, curriculum content and how learning occurs in a range of settings (Fuller *et al.*, 2005; Guile and Griffiths, 2001; Hodkinson and Hodkinson, 2005). Placing the learner at the centre enables issues arising to be identified through an analysis of the learners' experiences. Fewer studies address the impact of support for and experience of the tutors delivering professional programmes; what impact does tutor experience and perception of their role have upon practitioner learning? Lecturers whose perception of learning is as a non-problematic process, merely present information to the class and do not attempt to engage students in key issues (Martin, 1998). A similar situation can be seen in the workplace with students being simply offered an environment in which to pick up practice. A workplace culture that is ready for work-based learning and a team that are supportive of a learning culture are essential to support capability development (Williams, 2010). In addition, there needs to be adequate allocation of resources such as time and skilled facilitators to support learning in practice. A range of studies highlight time as a common barrier to supporting students and to facilitate their learning in the workplace (Billet, 1996;

Ellstrom, 2001; Flannagan, Baldwin and Clarke, 2000). Spouse (2001) emphasises the need for considerable financial resourcing for preparation of staff and the delivery of activities which support learning in the healthcare environment. Each of these studies identifying enablers and barriers to the delivery of practitioner education provide essential context for my research aim and the need to identify current challenges within the programme and the strategies stakeholders have developed to address them.

In acknowledging the need to develop strategies for delivering learning within the workplace I next review research into the role of the workplace environment and its impact on practitioner education.

2.2.8 Work based environment and Practitioner Capability

Work based learning requires the development of a process through which experiences become the foundation for learning and that learning provides the opportunity for developing practice (Fuller and Unwin, 2013, p.50). The focus of work based learning should be *learning* and the development of the individual's ability to learn through experience. Work based learning can be distinguished from the more traditional classroom learning in several ways; work based learning is centred on reflection on work practices, with learning arising from action and problem solving within this environment supported by others within this environment – shared problem solving (Raelin, 2007). An active participatory role is crucial for professional development allowing individuals to put their knowledge, competency and skills into practice within the workplace (Mugaloglu and Dognaca, 2009). Research into learning (Eraut and Hirsh, 2007) suggests that the most effective and valuable learning at work is often that which occurs through the medium of work, or is

prompted in response to specific workplace issues, as opposed to formal training or training courses. Such learning can be highly developmental, particularly when it is linked to a personally-valued purpose and engaged with critically and reflectively. Edwards (2005, p.61) takes this concept of participation further and suggests that learning in the workplace involves not just becoming part of the community but also gradually engaging and importantly, contributing to processes. Orr and Yun (2011) highlight the impact of such an approach. Where there is a vision of employees as learners, the students' contributions to the workplace are appreciated and students become 'actively incorporated into the "architects' world"' (Orr and Yun, 2011, p.14), nurturing their development. This concept of community is important within my enquiry and relates to the work of Lave and Wenger (1991) discussed earlier. However, it takes involvement within in a community further and acknowledges the importance of taking part in the 'day-to-day' workload and contributing to outcomes. My enquiry needs to identify not just how stakeholders position themselves within their role but also how they identify with the role of others and in particular the student-tutor-workplace relationship during the placement year.

Research would suggest that for many organisations work-based learning is still perceived as on-the-job training to perform tasks and that by providing training a learning environment is created (Garvin, Edmonson and Gino, 2008). The dominant epistemology of practice within many professions, especially those with a strong scientific influence, has been referred to as the model of Technical Rationality (Schön, 2002, p.40). Technical Rationality is based upon positivist epistemology and fails to take proper account of how professionals work in practice in order to achieve their desired goals. Technical rationality has been described as lacking both as an

instruction for and as a depiction of professional practice (Eraut, 2005). As previously highlighted, in the healthcare setting and in particular in a laboratory environment, cultural beliefs and standards associated with competencies are valued. These are evidence-based and measurable, originating from the positivist scientific paradigm which dominates healthcare. An approach positioned within this paradigm views rigorous professional practice as instrumental problem-solving through the application of scientific theory and technique (Greenwood, 1993). The focus is upon systematic problem solving and many professional curricula reflect this, being organised around the acquisition of generic competencies and articulated through logical problem-solving. It assumes that the problem has already been identified and that there is an agreed solution. This is an important concept for my research since such an approach can be seen within the instructions for those involved in the training of laboratory technicians just over 30 years ago:

> Learning rules and procedures: The giving of detailed oral and written instructions may sometime be less advisable than the use of algorithms, or step-by-step instructions in a family tree format. This “logical tree” method guides the student by a series of simple questions, each of which can be answered by “yes” or “no”. This method has advantage of communicating procedural and diagnostic skills (McMinn and Russell, 1975, p.2)

When trainees are only provided access to routine work activities and/or are denied support when they encounter new or unfamiliar tasks they are likely to have more limited learning outcomes than those who can participate in new activities, supported by experienced co-workers (Billet, 2002). Participation supports learning and the application of knowledge to the workplace environment. Learning and the development of knowledge is not just ‘how to perform set tasks’ but embraces becoming aware of the culture of the workplace, developing wider capabilities as well as a professional identity. The bringing of knowledge together from prior experiences and working with others is critical for the development of this practitioner identity

(Evans, Guile and Harris, 2013, p.157) and can only be achieved by 'involvement in practice'. The trainee must be engaged in 'learning conversations' and supported to develop a reflective approach to work-based learning. This approach shifts the focus to the social context and cultural tools that shape the way in which a person acts or interacts with their environment (Wertsch, 1994).

Bringing together the literature on the role of the tutor, work based learning and the workplace environment highlights the essential requirement for development of a framework of 'stakeholders' working together to provide a structure and culture that supports the practitioner learning experience. The tripartite concept of students' workplace learning is key not only in negotiating learning goals but also in the assessment of learning. Constructivist learning theories emphasise the significance of working together (Tynjala, 2008) with establishment and recognition of roles and responsibilities within such collaborative 'learning networks' (Lloyd *et al*., 2014, p.5). Awards linked to professional registration require a common definition and identity between stakeholders (Fullerton, Thompson and Johnson, 2013). There should be acknowledgement of who has responsibility as 'gatekeeper to the profession' to support this structure (Pellat, 2006). In addition, recognition of and training to support this role is essential for learning and development within the workplace (Duffy *et al.*, 2000; Henderson and Eaton, 2013).

To gain a clearer understanding of the influences upon developing learning goals and assessment I next review the literature on the introduction of a standards based approach and the role of the evidence portfolio.

2.2.9 Standards Based Approach and Practitioner Capability

The standards approach, outlining the desired competencies, can be defined as a conceptual map designed to guide students towards their goal of becoming a practitioner (Lester, 1999, p.45). However, map-reading or the technical rational model, as highlighted above, has been shown to be inadequate in workplaces where the professional's role is one of interpretation and coping in novel and challenging environments. Lester (1999, p.46) argues that practitioners need to move 'beyond map-reading and become active experimenters and constructors of their own practice and the theory on which it is based'. Thompson and Pascal (2012) discuss the trend of integrating workplace learning into awards linked to the professions to enable this integration of theory with practice, but highlighted that the theory underpinning this approach is often not integrated or supported.

In developing a greater understanding of the impact of the implementation of standards within the BMS programme I found Shuman's (2005) work on signature pedagogies and assessment interesting. It resonates with my research objective of developing a deeper understanding of how positioning of individuals informs the approaches adopted for programme delivery and in turn the impact of this upon capability development. He identifies how the delivery of programmes linked to professional practice, through teaching and assessment on an award, implicitly define the expected knowledge in the field. Signature pedagogies are the types of teaching 'that organize the fundamental ways in which future practitioners are educated for their professions' (2005, p.52) and can be identified at all levels of education. Schulman proposes that because professional awards must 'measure up to the standards not just of the academy, but also of the particular profession' (2005,

p.53) this presents a greater challenge. Adoption of the narrow definition of competency will result in an approach to training and assessment that focuses upon standards. This can be seen to have pragmatic value since it provides a framework to assist trainees to develop to a stage at which they are deemed competent to practise. It can enable the provision of individualised flexible training, transparent standards, and increased public accountability (Leung, 2002) and can provide service users with a degree of confidence that minimum standards have been reached. As outlined in section 2.1, healthcare professions have developed some form of competence based framework that articulates the minimum standards of practice that a trainee must meet to demonstrate fitness to practise, directed by their professional bodies (Tuxworth, 1989, p.11). In such awards the curriculum is developed through analysis of prospective or actual roles and students' progress is certified based upon demonstrated performance in some or all aspects of that role (Brightwell and Grant, 2013). Competence statements describe what effective performance means and the knowledge required in these distinct occupational areas. This approach places an emphasis upon 'output' measures with direct assessment of performance in assessments or the workplace being a measure of progression (Wolf, 1989, p.41). Schulman (2005, p.53) suggests that such an approach that focuses upon acquisition of knowledge and demonstration of competence in isolated tasks does not promote the learning and ongoing development of the student required to ensure professional development. It merely aims at achieving objectivity within assessment and ignores the complexity of the profession focusing on behavioural rather than cognitive ability (Brightwell and Grant, 2013; Fernandez *et al.*, 2012; Hodges, 2006). I identified in section 2.1 that the content and requirements of the BMS programme are guided by professional and

regulatory bodies. It is essential within my research journey to unpick the influence that these have upon both the stakeholders positioning and the approaches adopted for curriculum delivery to understand delivery of the current programme.

In keeping with a range of other professions, the development of a portfolio of evidence, detailing the individuals' journey against each of the articulated standards, has been utilised as a framework to support the BMS programme. Does this support the transition from 'map-reader' to 'map-maker'? Does the portfolio approach support this transition?

2.2.10 Evidence Portfolio and Practitioner Capability

Portfolios are a compilation of documentation of learning, an articulation of what has been learned and reflective accounts of the events documented or personal reflection upon these experiences. Portfolio-based learning recognises the centrality of reflection in the learning process. Reflection encourages deep-learning, or learning that impacts on the thinking, behaviour and performance of the learner (Boud and Walker, 2002, p.108). As a result, portfolios have been used to stimulate reflective learning in a variety of educational settings, including medicine, nursing and allied professions (Pearson and Heywood, 2004). However, the portfolio only supports the development of reflective practice in the practitioner if it is implemented and supported appropriately in the programme. Unfortunately, within many professions portfolios have become more a process of data collection than a reflective record of experiences (Endacott *et al.*, 2004).

There is consensus around the effectiveness of portfolios in formative assessments and tracking personal development, but concerns exist around their use within

summative assessments (Snadden, 1999). The assessment may alter the individual's approach to their learning and result in the content of the portfolio being driven by what students conceive as the required outcome (Biggs, 2003, p.140). A portfolio linked to a competence and standards approach can lead to complex roles being reduced to individual functions or steps requiring students to complete tasks in a reductionist and technicist way, gathering evidence to demonstrate completion of tasks rather than a clear understanding of processes and how they are interlinked. Studies have highlighted issues with the use of a portfolio approach to supporting practitioner development. In one study pre-registration nursing students reported finding the portfolio approach time consuming and ineffective in developing and assessing their learning and competence (McMullan, 2006). Davis *et al.,* (2001) stated that medical students perceived portfolio development as an excessive amount of paperwork which did not support clinical competence with limited consistency between assessors. In theory, portfolios should provide an effective means of exploring and understanding an individual's professional practice with a collection of artefacts and narratives representing their learning journey – supporting the map-making process espoused by Lester (1999). However, the research detailed above would suggest that it is the application of portfolios within the programme and their perceived role that limits the portfolios' ability to achieve this remit.

How do we assess such a collection of evidence? It has been suggested that a danger inherent in promoting conformity through a defined structure and assessment based approach results in individuality and private reflection being lost: these are the very things that a portfolio based approach is intended to promote (Paulson *et al.*, 1991). Ideally the portfolio should reflect the student as an individual, acting as a platform to chart their progress and achievements in a range of work experiences.

Material gathered should be selected by the student demonstrating an understanding of why it is relevant, its worth and their personal reflections on the experience (Paulson, Paulson and Meyer, 1991).

Those who advocate the use of the portfolio agree that to be successful students and tutors must be guided through its purpose, content and structure to remove uncertainty which is one of the main disadvantages of the use of a portfolio approach (Pitts, Coles and Thomas, 2001). Brennan and Lennie (2010) suggest that reflection should be used as a formative learning tool only rather than forming part of the assessed portfolio due to the reluctance by students to engage in self-reflection for fear of identifying weaknesses within their own development (Snadden and Thomas, 1998). Assessment limits the student's engagement in reflective practice and often results in descriptive or factual accounts of practice. If reflection on practice is to form part of the assessment for the student then a supportive approach must be taken, recognising the role of personal and professional judgements on the part of the learner, accepting the subjectivity of data and interpretations and engaging the assessor and assessed within meaningful dialogue (Pitts, Coles and Thomas, 2001). Assessment that values creativity and 'allows and understands the possibility of being wrong' is essential to support practitioner learning (Pitts, Coles and Thomas, 2001, p.355). A major issue identified in many studies is how students may feel uncertain about how to reflect and tutors may not necessarily have the skills or understanding to facilitate this self-reflection within students (Karlowicz, 2000). Pearson and Heywood (2004) suggest that the mentor-student relationship is more effective in stimulating reflection than the portfolio itself. Therefore, most studies advise that using a portfolio approach to support work based learning requires all parties involved to have a clear understanding of the role of the portfolio and the

appropriate approach to be used to develop practitioner capability. There must be a clear and shared vision of the purpose, content and structure of the portfolio. For my own enquiry I have identified that a range of stakeholders are involved within the programme. The Registration Training Portfolio for BMS directs both the university and work based curriculum and so there should be a shared vision of each group involved of the role of this portfolio and its implementation within the programme.

Endacott *et al.* (2004) found that there was a tendency for students and trainers to identify an outcome that needed to be completed and seek a procedure to fulfil this requirement. Learning about each of the pieces rather than learning how things are connected (Fraser and Greenhalgh, 2001). Such an approach supports the concerns highlighted by several researchers (Allmark, 1995; Gerrish, McManus and Ashworth, 1997) about the validity of the portfolio approach, questioning whether it assesses a student's ability to write about practice or a procedure they have undertaken rather than their ability to perform this in practice or know when to apply certain procedures. It is clear that the adoption of such an approach aligns with the competence approach discussed earlier and emphasises the importance of the concepts of competence and capability to my enquiry.

The main reason for the introduction of a portfolio into programmes for healthcare professionals' pre-registration training is to develop assessment strategies that integrate theory and practice, to regulate the training and competence of the workforce (Dearing, 1997; DOH, 2001b). For professional practice in the 'real-world', it is essential that knowledge and skills acquired in the academic setting are combined with practical skills and experiences within the workplace setting to enhance each other (McMullan *et al.,* 2003). It is essential that the portfolio provides

a rationale for this selection and includes reflection on and evaluation of the material (Wisker, 1996). The portfolio should not be just a collection of items in a folder, but must show how reflection by the student on the items gathered demonstrates learning. Such an approach encourages students to become more selective and autonomous in their gathering of evidence to demonstrate learning, development and the outcomes of their experiences (Buckley *et al.*, 2009). This aligns with a capability approach and emphasises the importance of capability in practitioner education.

Proponents of portfolios claim that they promote critical thinking and encourage students to become accountable and responsible for their own learning (Wenzel, Briggs and Puryear, 1998; Harris, Dolan and Fairbairn, 2001). The portfolio can also act as a focus of discussion between the student and tutor, supporting development of reflection and self-assessment (Wenzel, Briggs and Puryear, 1998; Harris, Dolan and Fairbairn, 2001). However, does this translate into practice in all settings, especially in a busy clinical environment? The use of portfolios to support capability development appears to only be suitable when a holistic approach to competence is used (McMullan *et al.*, 2003). When competence is acknowledged as an 'evolving, dynamic and relational concept involving judgement, values and attitudes' or in other words capability, portfolios have the promise of integrating these aspects (McMullan *et al*, 2003, p.292). Research has shown that such an approach cannot be achieved without properly prepared teachers within an enabling environment. There must be access to continual professional development opportunities that prepare educators not only with the required educational competencies and clinical knowledge required, but also with the ability to act as role models – demonstrating capability within their own practice (Fullerton, Thompson and Johnson, 2013). In addressing the

positioning of stakeholders on the current BMS programme and the challenges that they face within their role I aim to clarify the current situation and theorise how this impacts upon practitioner education and the development of capability.

2.3 Chapter Summary

The findings of the literature review identify the existence of a range of definitions and interpretations around the terms of competence and capability, along with the role of reflective practice, work based learning and portfolios. Certain theoretical assumptions support a capability approach with the role of socially situated and collaborative learning being essential alongside a critically reflective approach to learning by the individual.

However, definitions around theories of learning become less important than what is done in practice with the concepts they represent. The literature outlines that the development of a capable workforce is dependent upon appropriate delivery of the curriculum; the perceptions of role for each of the individuals involved and the support that all individuals receive in performing their role. Those supporting learning must appreciate how learning occurs and how best to support the development of the capable practitioner. In addition, the review has shown that provision of the resources to offer such a learning environment are essential: appropriate staffing levels, skilled facilitators, appropriate environments and commitment from all involved. However, there are limited studies addressing what happens in practice when these concepts are not addressed and the potential outcome of these programmes. I identified limited research into practitioner education in the field of biomedical science and no studies addressing how current approaches support the development of practitioners for entry onto the professional register. This highlights

the need for further research into this area to develop and understand delivery of the current programme and to better inform practice.

Chapter Three - Methodology and Methods

3.0 Introduction

In the previous chapter I introduced the evolution of the current pathway for pre-registration education for biomedical scientists in the NHS as well as reviewing current trends in delivery of courses linked to professional qualifications and registration. In this chapter I rationalise my focus and the chosen methodological approach. In discussing methodology I provide a brief history of grounded theory methodology (GTM) to establish essential context and fundamental strategies that are common in the different approaches identified in the literature. I highlight how adoption of a constructivist approach to GTM has both influenced and guided data gathering, analysis and synthesis of data. The research questions and data collection methods are described and I frame my own position as a biomedical scientist, academic and researcher within the field to clarify my choice of methodology and the role of the participants within the enquiry. As a practitioner researcher issues surrounding ethics, validity of findings and trustworthiness of data are foremost. I, therefore, outline in this chapter how these are addressed throughout my enquiry.

In the subsequent sections I describe the two data gathering stages for this enquiry, methods used and elucidate the analytical approach for the empirical data. I present the analysis of data gathered from both stages and by each of the methods in Chapter Four.

3.1 Theoretical Framework

In this section, I address the theoretical foundations underpinning this enquiry by introducing myself as the researcher and discuss how this informs the methodology and in turn the design of my enquiry (Birks and Mills, 2011).

3.1.1 Positioning myself as a researcher

To clarify the reasoning behind the choices I have made firstly in undertaking this enquiry and secondly with respect to my methodological direction, data gathering methods and approaches to analysis I will firstly introduce myself as the researcher. As noted in Chapter One, in my professional role as a BMS and course leader I had identified concern voiced in regional meetings by employers of BMSs that many students who have successfully completed their registration training struggle to apply themselves in the laboratory when employed as a BMS. I was concerned that students are not being adequately prepared for practice and the impact this may have upon the profession and future practice.

My approach to the research is influenced by the epistemological view that reality is socially constructed, not only external or objective. We develop knowledge via our experience and reflection upon these experiences. Research paradigms are often defined as ‘models or conceptual frameworks that help us to organize our thoughts…..and consequently inform our research design’ (Basit, 2010, p.14). The constructivist paradigm assumes relativist ontology (Denzin and Lincoln, 2011, p13). Realities for those in the BMS profession will vary depending upon a range of factors including their role, place of work and those they work with. As a result such constructions are alterable as are the constructs they represent. Constructivist

theories focus on the process by which learners build their own mental structures when interacting with the environment (Wenger, 1998, p.217). Research from such a perspective is concerned with identifying the various ways of constructing social reality that are available in a culture, to explore the conditions of their use and to trace their implications for human experience and social practice (Willig, 2001, p.7).

3.1.2 My position as an 'insider-researcher'

I bring 'insider' insight to my research and am involved in construction and interpretation of the data; supporting an understanding of the 'real experiences' of others as constructed through a shared social reality. Having trained as a BMS, practised in the field and delivered training and support for BMSs in the work-placement and academic setting, I have many shared viewpoints and interpretative understandings with participants in the enquiry. Bonner and Tolhurst (2002) identify three key advantages of being an insider-researcher. They highlight how the researcher has a greater understanding of the culture being studied, how they do not alter the flow of social interaction unnaturally, and have an established intimacy which supports both the telling and the judging of data gathered. As an insider-researcher I am generally knowledgeable of the politics of the workplace in which I am researching having practised in several of the departments previously. I am aware of both the formal hierarchy as well as 'how it works in reality'. As an insider-researcher I also have a greater awareness of how best to approach people at different levels within the hierarchy. This type of 'insider-knowledge' can take an outsider a long time to achieve (Smyth and Holian, 2008, p.34). There are potential disadvantages associated with insider research; familiarity with a subject or area can limit or guide interpretations (Greene, 2014). Bias due to pre-conceived ideas may

impact upon all stages from influencing study methodology to approaches to evaluation and interpretation (Merriam *et al*., 2001). Acknowledging bias and prior experiences as I proceed through data gathering and analysis enables me to reduce the impact this may have on the enquiry. I discuss in subsequent sections how I have drawn upon a range of methods of data collection and sources of data to address this. It is essential to engage in reflexivity rather than erase it (Charmaz, 2014, p.14). As I outline below, I draw upon reflexivity as a research tool throughout the enquiry and demonstrate in my interpretations and discussions how I am influenced by and influence the stages of my research.

3.1.3 Reflexivity

Within qualitative research, the essential requirement of reflexivity is acknowledged when we interpret the data we gather, the role we play in analysing the data and by identifying any preconceived ideas and assumptions that we may bring to data analysis – 'all research requires and operates through a set of pre-understandings' (Usher, 1996, p.38). In addition, reflexivity is not just about how we as researchers construct our own accounts, it must also recognise the role and interpretations of others in the research and the impact that our relationships with the researched has on data we gather (Pillow, 2003). In this respect, Usher (1996, p.38) describes reflexivity as a resource rather than a source of bias within research. Reflexivity becomes a methodological tool and employing reflexivity throughout my research journey entails paying close attention to my involvement in all aspects of the process from my 'constitutive role in the design of the study, data collection and analysis, and knowledge production' itself using this process to develop and inform my enquiry (Hsiung, 2008, p.214). Researchers need to regard themselves as influenced by and

influencing the situation they are investigating (McNiff and Whitehead, 2011, p.22); personal views, experiences and beliefs guide our choices between paradigms, approaches and methods used within our research (Crotty, 1998, p.7). As a practitioner and researcher involved in work based delivery my personal perspective has greatly influenced my approach; I can appreciate the lived experiences of both the trainees and trainers in the laboratory environment. I spent over seventeen years working in pathology in a range of different environments from large city centre teaching hospitals to small rural hospitals. During this time I undertook my initial training as a biomedical scientist (via the logbook route) and had the role of both laboratory manager and training officer/manager. I start with the advantage of being familiar with both the language used and the working environments in which learning takes place. However, I must also acknowledge that my own lived experiences have formed my own reality of training and working in biomedical science and I must ensure that I am receptive to the views and realities of others. In addition, I now have a role in delivering the academic portion of the BSc Biomedical Science award. This may impact on how training officers and other academics respond to my questioning. Although students are aware that I am a registered practitioner they will probably see me as a University lecturer first since they routinely see me in this role. Again, this may influence the responses to my questions or how they share their experiences with me and I address this further when outlining the methods selected to gather data and my approaches to analysing and interpreting this data.

3.2 Methodology

Qualitative research has the power to inform practice by deepening our understanding of experience and of the phenomena that represent that experience. It

is the variable and personal constructs of the participants, elicited and developed through interaction between the researcher (myself) and the stakeholders that supports my understanding of the phenomena of practice within this award. For this it is important that the ideas emerging from my enquiry originate from those involved in the current programme since they are the most knowledgeable about the subject matter. In addition, they are the ones who will need to integrate the constructed theory into practice by taking ownership of the changes required to improve the programme and so support capability development. The training officers and laboratory managers delivering and supporting the work based curriculum, students undertaking the course and work placement, and the academics supporting the taught curriculum all influence programme implementation and delivery.

The aim of the enquiry is to produce useable knowledge in an unexplored area; to develop a greater understanding of how the positioning of the stakeholders, influenced by a range of factors and directed by professional and regulatory bodies impacts upon capability development in the BMS. I use the term participants for those stakeholders taking part in the enquiry since they provide a vital contribution to both data gathering and interpretation. Throughout the study I draw upon their expertise to assist me in conceptualising and gaining a deeper understanding of the data. I avoid the term ‘informants’ since it suggests a positivist epistemology and the collection of facts. However, the participants in the enquiry are health professionals and scientists who are more used to objective observers searching for objective truths. This viewpoint reflects the positivist paradigm which sees social reality as objective with patterns of causality (Basit, 2010, p.14). In contrast, the interpretivist paradigm studies the viewpoints of research participants, interpreting an already interpreted world (Basit, 2010, p.15). Reality is constructed by individuals because

of their experiences and how they construct meaning from these experiences. The challenge is to use a methodological approach that reflects my own ontological and epistemological position whilst producing theory that is relevant and acceptable to all participants including those who take a positivist stance to research and theory development. As I will outline in my findings and conclusion, my initial distinction between and definition of informant, participant and stakeholder become quite pertinent as I identify the lack of clarity around a definition of these terms, their meaning and the role requirements for those involved in the programme.

My enquiry seeks to understand pre-registration training for biomedical scientists from the viewpoint of those within it. I require a methodology that allows me to draw out both meaning and understanding of complex human experiences, whilst also addressing the influence of organisational structures and relationships on the construction of communities of practice and learning environments. Grounded theory and phenomenological research have both been used by others to study social situations and the experiences of individuals. They both start with distinct instances of human experiences and slowly unpick these. However, phenomenological analysis is descriptive and the aim is to provide a descriptive understanding and 'true to life' conceptualisation of the experience (Holstein and Gubrium, 2005, p.485). In contrast, grounded theory assumes that meaning must be constructed, and the researcher moves from initial descriptive analysis to higher level abstractions. This is supported by the development of theoretical categories that allow explanatory models to be constructed (Charmaz, 2005, p.509). It takes a 'reflexive stance on modes of knowing and representing studied life' and does not assume that data 'simply await discovery in an external world' (Charmaz, 2005, p.509). Using a GT approach allows the researcher to see beyond the empirical process and develop a

deeper understanding and so a picture of ‘the whole’. Unlike phenomenology, it enables the researcher to move beyond the experiences of individuals to develop a deeper understanding of multiple interactions and their influence upon social situations.

I am, therefore, drawn to grounded theory methodology since it is defined in the literature as an approach that allows the converting of information and experience into theory: the goal of grounded theory is to generate a plausible, and valuable, theory of the phenomena that is grounded in the data (Braun and Clarke, 2006). Glaser (2010, p.1) outlines how GTM allows theory to be developed using a systematic approach and is a ‘total methodological package’.

GTM at first appears to address my research aim of generating theory about how the perceptions of participants as stakeholders and the influence of standards and legislation impact upon delivery of a programme. However, I was initially unsure about adopting GTM due to its status as a much-contested concept. Tensions exist between those who practise variations of GTM. Seven different versions of GTM have been listed by Denzin (2012, p.454); positivist, postpositivist, constructivist, objectivist, postmodern, situational and computer assisted. However, although such variations exist and each version endorses contrasting ontological and epistemological positions, there are commonalities. All are dedicated to remaining true to the studied world, providing adaptable guidance and developing theory that is grounded in the data and reflects the ‘worlds’ being studied (Denzin, 2012, p.455).

GTM has evolved since its initial inception and in deciding whether to draw upon GTM for this enquiry I initially needed to ‘grasp the inherent complexity’ of this

methodology and its variations (Bryant and Charmaz, 2012, p.11). To explain my methodological approach I, therefore, start with a review of the origins of GTM and a discussion of the 'version' that I draw upon for this enquiry.

3.2.1 Origins of Grounded theory

Grounded theory was initially presented in '*The Discovery of Grounded Theory*': the basic theme being the 'discovery of theory from data systematically obtained from social research' (Glaser and Strauss, 1967, p.2). It is a methodology that enables the construction of theory about issues of importance in individuals' lives (Glaser and Strauss, 1967) enabling theory to be constructed through what is defined as an inductive process of data gathering (Morse, 2011). Unlike the traditional positivist approach dominant at the time, the researcher has no preconceived ideas to prove or disprove, instead issues of importance emerge from the stories that the participants share with the researcher. Glaser and Strauss stressed the role of GTM in developing a theory that is usable in practical applications: 'the substantive theory must enable the person who uses it to have enough control in everyday situations to make its application worth trying' (Glaser and Strauss, 1967, p.245). Their 'classic grounded theory' shares many features of a positivist scientific stance; separating theory from empirical data, generalizability, reproducibility and predictability (Alvesson and Skoldberg, 2010, p.72). However, as outlined it places an emphasis upon theory generation rather than verification and on qualitative rather than on quantitative data.

GTM derives its theoretical underpinnings from Pragmatism and Symbolic Interactionism (Corbin and Strauss, 1990) and as a result draws upon two important principles from these two philosophical traditions. The first acknowledges

phenomena as continually changing as a response to existing conditions. The second rejects the concept of determinism; individuals can make choices based upon their perceived options. These two principles allow grounded theory to 'uncover relevant conditions' and to determine how individuals 'actively respond to those conditions……and to the consequences of their actions' (Corbin and Strauss, 1990, p.419). The researcher, therefore, has the role of capturing this interplay. Theory evolves during the research process, being produced by a continuous process of data gathering and analysis. Data analysis does not wait until all data has been collected as in many other approaches, the search for 'meaning through interrogation of the data' begins at the early stages of data gathering (Goulding, 1999, p.6).

It is the fact that grounded theory is a general methodology based upon a way of thinking about and conceptualising data that has resulted in it being adapted from its initial form both by the creators of the approach and by other researchers from diverse areas of study: including experiences with chronic illness (Charmaz, 1983) and the development of reproductive science (Clarke, 1997). Although originally used by sociologists, researchers in practitioner fields such as education and medicine have increasingly used GTM in their studies (Sbaraini *et al.*, 2011; Walter and Gerson, 2007) with constructivist grounded theory being the version that most of these studies draw upon.

3.2.2 Constructivist Grounded theory

Constructivist Grounded Theory Methodology (CGTM) is one version of GTM. It is ontologically relativist and epistemologically subjectivist, reshaping the interaction between the researcher and participants. Charmaz (2005) who was a student of

Glaser and Strauss emerged as the leading proponent of CGT and, as I discuss below, is the main influence on my approach to this enquiry. CGT adopts many of the strategies of the classical approach but moves it away from positivism. The researcher embraces an inductive, comparative, emergent and open-ended approach as argued for by Glaser and Strauss (Charmaz, 2014, p.12). In addition, CGTM reflects the beliefs of constructivism as a paradigm of inquiry. As such it also has its roots in the partnership of Strauss and Corbin whose studies constructed and reconstructed the data generated with participants as opposed to allowing theory to emerge as in classic grounded theory. Corbin and Strauss define their approach to developing theory as the development of explanations from the data which integrate the full range of interpretations and relationships (Corbin and Strauss, 2008, p.64). Theories are, therefore, developed by the researcher based upon their own perspectives and interpretations which indeed does make them fallible. However, they argue that this does not mean that these theories are not sound or lacking in value (Strauss and Corbin, 1994, p.279).

This contrasts with the original approach recommended by Glaser and Strauss where the researcher was advised to avoid assumptions or developing hypothesis based upon the research and studies of others (Scott, 1996, p.77). Glaser stated that researchers should enter the field of inquiry with as few predetermined thoughts as possible and that this would enable them to maintain sensitivity to the data which was not clouded by previous studies or hypotheses (Glaser, 1978, p.3). As outlined by a former student of Glaser and Strauss (Covan, 2012, p.68), Glaser had an extensive knowledge of the literature and so could bring data from other studies and personal history to support the understanding of data under investigation.

Interestingly, Glaser and Strauss acknowledged the tensions for practitioners entering the field with no biases or prior knowledge in their initial book as a foot note:

> Of course, the researcher does not approach reality as a *tabula rasa*. He must have a perspective that will help him see relevant data and abstract significant categories from his scrutiny of the data (Glaser and Strauss, 1967, p.3).

In this they acknowledge that our prior experiences and knowledge are influential in how we approach the field, gather and interpret data.

Bryant (2003) argues that the classic approach to grounded theory views the researcher as a neutral observer. This is based upon Glaser's suggestion that:

> …the two most important properties of conceptualization for generating GT are that concepts are abstract of time, place, and people, and that concepts have enduring grab (Glaser, 2002).

This stance denies the influence of individuals and their environment. However, from the epistemological stance taken within the constructivist paradigm, it is the creation of interpretive understanding not general concepts that supports the development of theory. A repositioning of grounded theory into an interpretive conceptual frame and away from deterministic variables enables the researcher to recognise their previous experience and perspectives and acknowledge the potential impact this has on both data gathering and development of theory (Bryant and Charmaz, 2012, p.51). Charmaz (2011b) describes how it is a representation of experiences which is provided, not a replication. She outlines how the researcher interprets the data recognising the human, social and political relationships that shape the nature of the inquiry, taking account of all involved in the research as well as when and where these understandings develop (Charmaz, 2011b, p.169).

The approach, therefore, is based upon the construction and reconstruction of data generated with participants, as opposed to uncovering an emergent truth as outlined in classical grounded theory (Mills, Francis and Bonner, 2008). CGTM, rooted in

pragmatism and relativist epistemology, assumes that neither data nor theories are discovered, but are constructed by the researcher as a result of his or her interactions with the field and its participants (Charmaz, 2014, p.13). As a logical outcome, constructivist grounded theorists ‘advocate recognizing prior knowledge and theoretical preconceptions and subjecting them to rigorous scrutiny’ (Charmaz, 2008, p. 402).

An approach informed by CGTM enables the researcher to allow the data gathered to direct or redirect each stage of the enquiry allowing research questions to be addressed. This is defined as an abductive approach where the researcher analyses the data, identifies concepts and new ideas and then uses further data gathering to ‘check’ these new concepts (Bryant and Charmaz, 2012, p.46). Abduction is, therefore, a way of reasoning findings in the data. Possible explanations for the observed data are considered and hypotheses are formed to be confirmed or refuted until the most plausible explanation of the data is arrived at. This approach allows the researcher to pay attention to data that does not fit previous interpretations or generalisations; making connections between things that the researcher would previously not have associated with one another. Therefore, such an approach relies on reasoning and making inferences about empirical experiences (Charmaz, 2014, p.201); gathering data, reasoning about experiences, making inferences and then checking through further data gathering and analysis. Using this approach helps the researcher to be actively involved with the data analysis, allowing them to formulate questions and test these with new data. By moving through comparative levels of analysis, the data gathering and analysis at each stage shapes the next stage of the inquiry. This approach reduces the influence of preconceptions and rigorous examination of the data and systematic scrutiny increases analytic value. By

continuously scrutinising the data the researcher will ‘become close to the data’ and this strengthens my claims about it (Charmaz, 2011a, p.361). Credibility of findings is achieved through such intimate familiarity with the data, systematic comparisons and presentation of logical links between the data gathered and arguments presented (Charmaz, 2014, p.337).

The process of concurrent data generation or gathering and analysis is fundamental to grounded theory research (Birks and Mills, 2012, p.10). The logic of abduction is used throughout the whole research process, acknowledging that data are always social constructions; they are not exact portrayals of reality (Charmaz, 2006, p.188). Charmaz (2014, p .192) acknowledges the questioning and changes of direction associated with the research journey. She acknowledges that undertaking research is not simply a matter of travelling from A to B and may involve taking the ‘wrong route’ or ‘heading off’ in a new direction to find the end point. To achieve this process *theoretical sampling*, is used where the researcher deliberately seeks participants who have had particular experiences or to whom particular concepts appear significant (Morse, 2012, p.240). The initial data analysis highlights areas for further exploration, guiding the sampling process by on-going theory development; guiding the route to be taken during the research journey.

In CGT there is an initial strategic decision about what or who will provide the most information-rich source of data to meet the analytical needs of the enquiry and this then guides subsequent phases. Memos are also used to allow the researcher to map out possible sources to sample theoretically, as well as creating an important audit trial, identifying the decision-making processes. Charmaz (2011b, p.174) identifies memo writing as ‘pivotal’ to grounded theory, supporting identification of

emerging categories. Memos, therefore, often take the form of entries in a reflective journal or continuous reflective 'jottings' supporting credibility of findings.

Constant comparative analysis continues throughout a CGT study allowing construction of the grounded theory through interactions with people, interpreting their perspectives and the research practices (Charmaz, 2014, p.17). Glaser and Strauss stress the role of ongoing reflection and analysis formalised in coding procedures, generation of categories and writing of theoretical memos (Glaser and Strauss, 1967, p.28). Coding of the data allows links to be made between the data collected and constructed theory. Memos provide ways of comparing and exploring the codes developed and to direct further data-gathering as required.

A CGT approach has been adopted by researchers to develop a deeper understanding of complex situations in a range of different disciplines including education (Jones and Hill, 2003), psychology (Allen, 2007) and medicine (Simmons, Brüggemann and Swahnberg, 2016). Each study acknowledges the work of Charmaz in justifying the use of a CGT approach for their research. Drawing upon these studies in other disciplines, I identified CGT as appropriate for this enquiry to develop an understanding of approaches adopted by stakeholders within the current BMS programme and how these approaches impact upon the development of capability and preparation for practice in students on the programme. By also drawing mainly upon the work of Charmaz (2006) for my enquiry, a CGT approach not only allows me to acknowledge my role in the enquiry and how I may influence the data gathered due to my prior experiences and position as an insider-researcher, but also how the various stakeholders influence and construct the perceived reality of the current programme; providing resonance of findings. As I proceed with my enquiry reflexivity, as outlined previously, allows me to identify and highlight my prior

knowledge and theoretical preconceptions allowing me to carefully examine my approach, the methods I have used and how I have analysed the data. By using a CGT approach I use the voices of the participants in this enquiry to guide each stage of the enquiry rather than gather data to confirm or refute a pre-conceived theory. This is essential to ensure that the approach I take appropriately addresses the research questions and the findings constructed from each stage of empirical data gathering and theory development.

3.3 Construction of Research Questions

As demonstrated in Chapter two the current biomedical science programme has evolved in a background of major changes to both the profession and approaches to learning and teaching in the wider context of professional practice. The concept of capability and how practitioners are supported to develop as capable practitioners varies with many definitions and approaches offered. Most investigations conducted into integration of workplace learning to support practitioner development have focused upon the learning environment and pedagogical approaches adopted to support the learner. Little attention appears to be given to understanding the impact of integrating workplace learning and development of individuals for professional practice into scientific programmes with a strong academic focus. Relevant research within the field of biomedical science only focuses upon comparison of curriculum frameworks (Brennan and Little, 1996) and how changes in practice have impacted upon roles in the clinical environment (Hallworth *et al*., 2002; Plebani, 2002).

Given that HEIs are increasingly viewed as having a major role in preparing students for the workplace and for supporting registration for entry into a range of professions there is a need to understand the practicalities of this approach for the profession.

This directed the shaping of my research to focus upon the experiences and perceptions of those involved in the current BMS programme. The enquiry aim is to generate a substantive theory of BMS training grounded in the experiences of those involved in the programme. To aid my enquiry I posed three research questions developed through reflexive engagement in the field of practice. CGT encourages starting an enquiry with a broad research topic and following specific research questions that arise from issues in the field (Charmaz, 2016)

Research Questions

1. What are the main factors that stakeholders (students, training officers, laboratory managers and academics) perceive as barriers or opportunities for the current programme?
2. How are approaches adopted for curriculum delivery influenced by these factors?
3. What is the impact of approaches adopted by stakeholders on the development of practitioner capability?

By proposing open questions I provide flexibility to explore and respond to the data I gather, allowing a constant comparative approach to my enquiry, raising the level of abstraction of the analysis (Charmaz, 2011, p.172). This approach allows the participants in my enquiry to contribute as phenomenon become defined which enables new insights to be mutually constructed by myself and the participants, grounded in our situated world views (Charmaz, 2011, p.169).

3.4 Ethical considerations

I obtained ethical approval for the enquiry from the University Ethics Committee prior to commencing my research. Silverman (2014, p.152) suggests that ethically responsible research practice requires the researcher to frame their research topic. By ensuring a strong ethical framework I am able to safeguard myself as the researcher and also the participants involved in the enquiry. An ethical framework also facilitates the research process by providing support for the conduct of the enquiry and credibility of the findings (Cousin, 2009, p.17). The purpose of my research is to contribute to knowledge around pre-registration training within my own professional field of biomedical science. Framing my aims, the individuals or groups who may be interested/affected by my research and any implications the outcomes may have on these groups provides clarification of my research area. When analysing data gathered as part of this process it is essential to demonstrate credibility of findings and interpretations. Ethical guidance (BERA, 2011, p.5) requires that individuals taking part in an enquiry should be treated fairly, sensitively and with dignity without prejudice, ensuring that all voices and opinions are represented without bias. To ensure that all participants were fully informed of the aims of and their role in the enquiry I made sure that voluntary informed consent was obtained from all. This was achieved either via:

- Written consent in stage one - using questionnaires to gather data (Appendix 1). By completing the questionnaire and returning it individuals consented to take part in the enquiry.
- Verbal consent in stage two -using focus groups and interviews to gather data – transcripts were made available for participants to review and comment upon.

In explaining the aim of the enquiry, my role, and their expected role, I provided the participants with the knowledge required to make an informed choice to contribute. Research participants could withdraw from the enquiry at any point and request that any contribution they made (e.g. questionnaire response or data as part of a focus group or interview) is removed from the enquiry (BERA, 2011, p.6).

All data gathered as part of this enquiry was stored securely on a password-protected computer and encrypted memory stick with access restricted to the researcher. Additional interactions with individuals, field notes and memos were all managed according to the Data Protection Act (1989) with the identify of individuals protected via the use of codes (Table 3.2). Paperwork including any paper based questionnaire returns and correspondence were kept in a locked cabinet. Data was only used for the declared purpose of the enquiry.

In each stage of the data gathering and analysis process discussed below I highlight the ethical framework to which I adhered and the steps taken to maintain confidentiality and protect the vulnerability of both students and other research participants. These include:

- Participant validation of data used (Silverman, 2014, p.93). This provides the researcher with additional insight of the data gathered whilst enabling participants to clarify or remove comments they have made. This supports development of mutual trust between the researcher and participants.
- Coding of participant responses to maintain confidentiality and achieve anonymity for participants in the enquiry (Table 3.2 – Allocated participant codes)

- Keeping time commitment to a minimum and clearly outline the degree of involvement participation in the enquiry will entail for stakeholders.

Denzin (1989, p.25) suggests that since each method employed for data collection 'reveals different aspects of empirical reality, multiple methods of observation must be employed'. He refers to this as triangulation and defines four different approaches; triangulation of data, investigators, theories and methodologies (Denzin, 1989, p.237). I have employed methodological triangulation by using a range of methods with my aim being to 'secure an in-depth understanding' and representation of the field of study in my final conclusions (Denzin and Lincoln, 2011, p.5). Such an approach not only addresses ethical considerations but also ensures trustworthiness of findings.

3.5 Trustworthiness of findings

Quality in qualitative research is often described as quite challenging since traditional definitions of reliability and validity applied to research are based upon quantitative approaches and a positivist philosophy (Cohen, Manion and Morrison, 2007, p.133). Lincoln and Guba (1985) pose the question:

> '*How can an inquirer persuade his or her audiences (including self) that the research findings of an inquiry are worth paying attention to, worth taking account of*? (p.290).

Rather than claiming reliability of data Searle and Silverman (1997) suggest that authenticity of data is the goal in qualitative research. Charmaz (2014, p.338) proposes four criteria that should be addressed to ensure quality in CGT research: credibility, originality, resonance and usefulness. In discussing my grounded theory journey below I highlight how I address each of these criteria through the methods adopted for data gathering and analysis to provide originality and credibility to my

enquiry which in turn increases the resonance, usefulness and value of my contribution (Charmaz, 2014, p338). I present a reflection upon the quality of the enquiry in my final chapter, Chapter Seven.

3.6 Grounded Theory Journey

A summary of the stages of my research journey is provided in figure 3.1. This visual representation is adapted from Charmz's (2014, p.18) outline of GTM. The diagram reflects the continuous iterative nature of data gathering and analysis leading to theory development. It identifies the two stages adopted for data gathering as discussed in subsequent sections. Although the representation is in a linear format detailing each of the stages of data gathering and analysis, in practice I continually moved back and forth between each of these steps. I engaged in constant comparative analysis, returning to data and coding as I developed and refined the categories, continuously raising questions which led to additional data collection and review of previous interpretations.

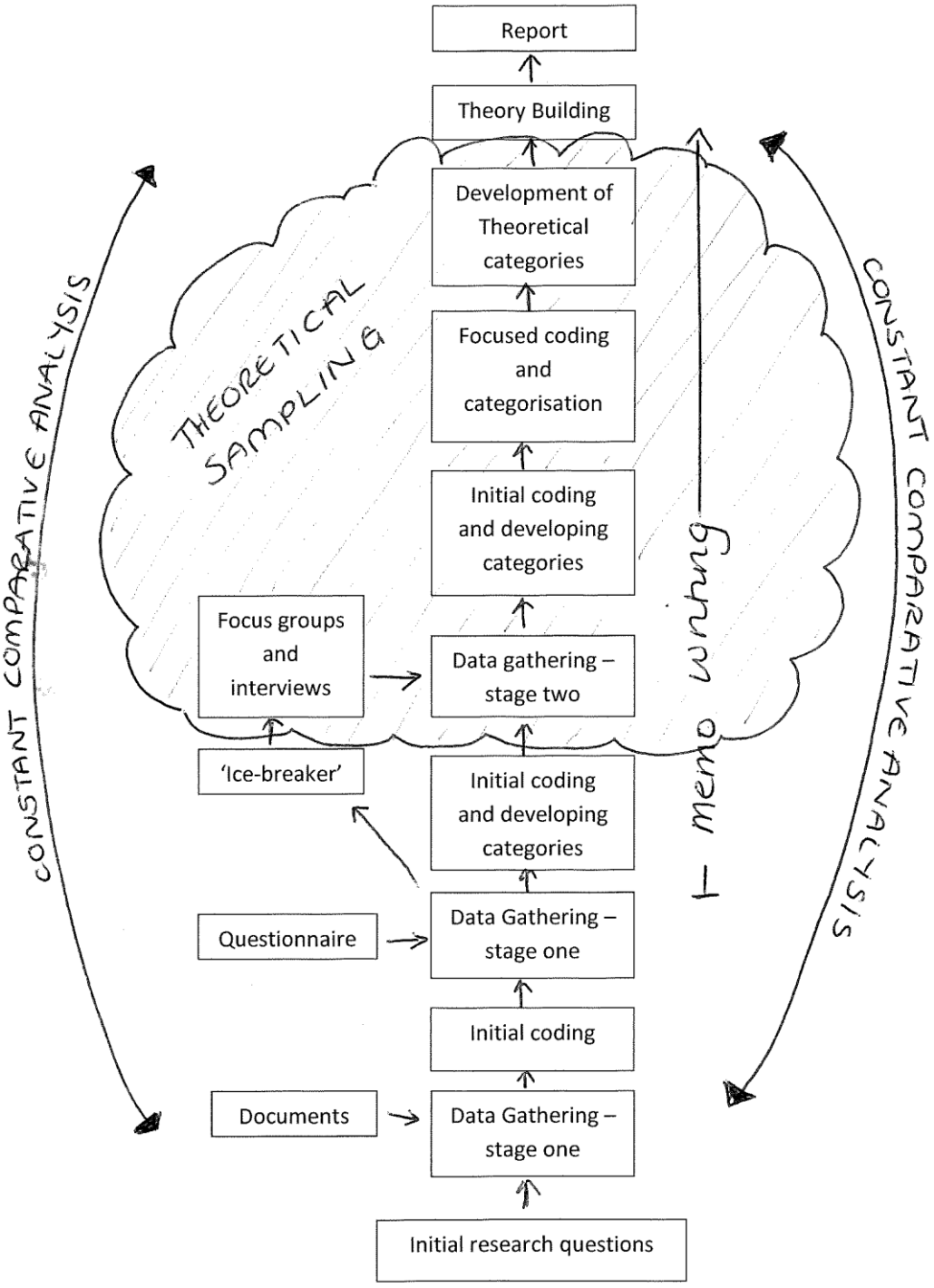


Figure 3.1 Visual representation of my grounded theory journey –(adapted from Charmaz, 2014, p.18)

3.7 Data gathering methods – stage one

In describing my methods it is important to highlight some of the problems that I encountered during my research journey and acknowledge why I selected the approaches outlined and summarised in figure 3.1 (Grounded Theory Journey). A range of data collection methods can be used within grounded theory methodology and Charmaz (2014, p27) suggests that our data collection methods 'flow *from* the research question and where we go with it'.

3.7.1 Developing the Enquiry

I made an initial decision to undertake data gathering in two stages and to take a novel approach of using a questionnaire to both collect data as well as using the responses as a tool to support the second stage of data gathering. A questionnaire allows a broad initial approach to data gathering and my aim was to gather a breadth of ideas in the contemporary field of biomedical science and identify preliminary ideas for further exploration via focus groups and interviews. Questionnaires are appropriate for gathering data about abstract ideas or concepts that are otherwise difficult to quantify, such as opinions, attitudes and beliefs (Artino *et al.*, 2014). They are also useful for collecting information about behaviours that are not directly observable by the researcher (e.g. time spent supporting training), assuming respondents are willing and able to report on these behaviours. The use of questionnaires requires extensive preliminary work to identify and validate questions; checking that the questions are appropriate for the context in which they will be used (Rugg and Petre, 2007, p.142).

I initially struggled with the design of the questionnaire and development of the questions. My first draft questionnaire contained very specific questions requiring quite an in-depth response from participants. Taking a reflexive 'step-back' (Usher, 1996, p.38) from the questions it became obvious that they reflected my own perceptions of issues around pre-registration training as well as current theories from the literature; gathering data to support theories rather than constructing theory from the data gathered (Hsiung, 2008; McNiff and Whitehead, 2011, p.22). I initially posed questions around approaches to reflective practice and the assessment of specific skill competencies vs. capability within the workplace. I piloted the questionnaire with two colleagues who support placement students during their studies. Feedback from these two colleagues was extremely supportive. They helped me to identify that the questions I posed were too directed, expecting too much in response and were more suited to an interview or focus group scenario rather than being a starting point to direct further data gathering. I realised that my approach reflected a scientific one of supporting or refuting a proposed hypothesis. Reflexivity helps to challenge our standpoints and to avoid obstacles that would impede the development of an enquiry (Usher, 1996, p. 39).

The aim primarily for this first stage was to gather perspectives from a range of stakeholders on the delivery of registration training to identify specific areas for further data gathering and analysis. Drawing from Vygotsky (1978), sociocultural theory places great emphasis on looking beyond the individual to interactions with others. It emphasizes the ways in which societal constructions and definitions are dynamic and change depending on those involved. Kelle (2005) also argues for the use of pre-existing literature as possible sources of 'inspiration', to develop ideas and acknowledge associations in line with the logic of abduction to allow the researcher

to focus attention on certain phenomenon, aspects or nuances. Extant texts and research literature should be viewed as invaluable sources allowing sensitisation to the field of study rather than as obstacles. Identifying the need to review and make use of existing literature places me in a better position to address my research questions; by identifying key themes emerging from 'formal documents' addressing BMS training provides a starting point for data gathering and for the initial process of abduction to commence. Therefore, I decided to 'take a step backwards' and the first stage of data gathering evolved into a review of documents to identify key conversations in the field of BMS relating to pre-registration training and its current delivery. Professional publications and minutes from regional training meetings were accessed and coded to assist me in identifying key themes and categories to inform the questionnaire design as part of stage one as outlined in fig. 3.1 (Grounded Theory Journey). This approach draws upon Charmaz's position where she states that 'grounded theory necessitates being as open as possible to what is happening….standpoints and starting points influence *how* I see the project data and *what* I see in them' (Charmaz, 2011b, p.170). In undertaking this initial stage (document review and questionnaire) I reduce my own influence upon the initial direction of the enquiry; since I am an insider-researcher this additional dimension to data gathering assists in reducing the influence of my own lived experiences on the initial direction of data gathering. As I expand upon below it helped to identify sensitising concepts to direct and support the second stage of data gathering; focus groups and interviews. The methods used in stage one are detailed below. I present the analysis of the data gathered from this stage in Chapter Four.

3.7.2 'Taking a step backwards' -Analysis of documents

The Biomedical Scientist is a monthly journal published by the Institute of Biomedical Science providing a source of information for those practising in the field of biomedical science. *The Biomedical Scientist* is the major professional publication for news and science articles. I searched the archive of the Education and Training section of the publication for the past 10 years looking for articles relating to pre-registration training, the registration training portfolio or the role of training in the clinical setting. My search criteria were relatively broad, hoping to encompass articles on any major issues or changes occurring in the profession or clinical laboratory environment that may have had an impact upon delivery of training. The aim of reviewing these publications was to identify 'sensitizing concepts' and 'disciplinary perspectives' to provide a place to start, supporting the development of ideas about processes that will define the data (Charmaz, 2006, p.17).

To identify articles of relevance from *The BMS* a search was undertaken from 2000-2013 in the categories of *General Science, History, Professional and Workforce, Media and Publications, Quality, Miscellaneous, Careers, International, Careers, Instrument Training, Information Technology, IBMS, Education and Development and Management*, which are pre-defined search categories on the journal website. Subject specific categories were not searched since a quick review demonstrated that these concentrate on specific conditions, diseases or techniques related to these disciplines.

In addition to the published articles, I also reviewed minutes from meetings I attend as part of my professional role in the region for the training officers group (Biomedical Science Training and Workforce Planning group) and University

Employer Liaison committee. These meetings are attended by Training leads, Training officers, laboratory Managers and representatives from the local Universities delivering BMS programmes. Information obtained from these sources was anonymised and represents information available to me within my role as course leader in supporting course development. The aim of reviewing the documents was to provide an insight into practices, perspectives and relevant events. The minutes of the meetings represent comments made by and issues faced by practitioners involved in both the management and training of BMSs. They give a voice to current issues being faced by individuals working in laboratories in the region and provide an insight into the factors that influence training from an academic perspective too. The published articles represent a wider stakeholder group and publication of material is under the control of the professional body. It is essential to acknowledge the professional role and focus of such documents and they were coded to identify any important themes to be investigated further by subsequent methods of data gathering. Such documents can be regarded as 'dominant and elite voices' (Charmaz, 2014, p.53). By gathering data from these sources my aim was to capture any disconnect between the perceptions and focus of elite voices and those of the stakeholder groups involved in the programme at a local level in the region.

Coding of documents was used to identify similarities and differences in agendas and perceptions around the delivery and requirements of the BMS curriculum for further analysis. The review of such documents adds another dimension to my enquiry providing an accessible, usable and legitimate source or alternative and intriguing questions (Charmaz, 2014, p.45). I continued to return to, and reflect upon

these documents. I found that as I progressed through the enquiry returning to these documents helped me to develop greater awareness of underlying themes not initially visible or ignored during my initial approach; interpreting and re-interpreting the data. This process of abduction permits new discoveries to be made and is a 'means-of-inferencing' allowing a deeper insight and new knowledge (Reichertz, 2012, p.216)

3.7.3 Questionnaire post document analysis

The questionnaire was developed based upon both the feedback from the initial questionnaire and the coding of documents. By simplifying the questions and using a Likert scale the questionnaire was more 'user friendly' and allowed responses to be correlated (Appendix 2 – copy of questionnaire). A quantitative approach allowed a simple numerical analysis of responses to questions to identify themes to direct further data gathering in the second stage.

Questionnaires were made available in either a paper or electronic version. How research participants perceive the questionnaire's role and how it can be viewed influences both participation and what is revealed. As part of my ethical framework, it was essential that participants understood why I was undertaking the enquiry and how the information provided would be used. To support this I provided a brief outline of the enquiry with each questionnaire (Appendix 1), assuring confidentiality and encouraging replies (Cohen, Manion and Morrison, 2007, p.317). Pre-written envelopes were provided with the questionnaires to allow anonymity of returned questionnaires. These were distributed by a range of approaches to each of the stakeholders with questionnaires adapted to address the specific stakeholders'

position in the programme. The method of distribution and the groups approach is outlined in the table below (table 3.1).

Stakeholder Group	Method of distribution
First and Final year students	End of a teaching session
Academics	Via internal mail – pre-printed return envelopes
Training Officers/Laboratory managers	Via main contact in each Trust + on-line version available if requested. Pre-printed return envelopes
Students undertaking work placement and university study	During a university workshop – pre-addressed envelopes provided for return

Table 3.1 Summary of questionnaire distribution and methods of distribution

By gathering, summarising and interpreting responses from a range of stakeholders, key concepts were identified in the data and these were used to guide the next stage of the enquiry. Data analysis and a discussion of response rate to the questionnaire is presented in Chapter Four.

One of the major strengths of CGTM is that by undertaking concurrent data collection and analysis, new directions can be investigated and leads followed as the research develops. The sampling process is guided by on-going theory development supported by constant comparative analysis. This approach enabled me to establish what is expected of the current award, why participants have different opinions of the curriculum and whether these are linked to understandings of 'the capable practitioner', definitions of a stakeholder and perceived roles in supporting the programme. Immersing myself in the data and undertaking systematic comparisons supports demonstration of credibility of findings. In addition, a CGT approach allows professional practice to be viewed through a different lens providing explication of

stakeholders' daily experiences: it supports the development of new conceptual renderings and so originality of findings.

3.8 Data gathering methods – stage two

Two methods of data gathering were employed for this second stage of the enquiry; focus groups and interviews. These are discussed in detail below and I present the analysis of data gathered from this second stage in Chapter Four.

3.8.1 Focus groups

As outlined, the second stage of the enquiry started with the use of focus groups to investigate the developing categories identified in stage one. The aim of the focus groups was to advance emerging ideas from the initial data gathering, allowing a deeper investigation and interpretation of how these are manifest within the behaviours of individuals and communities of practice towards pre-registration training. Focus group research is based on the principle that 'rich data can be elicited from group interactivity' (Cousin, 2009, p.41). Focus groups are often used for both exploration and confirmation as well as collecting data about attitudes and perceptions (Kanuka, 2010, p.101). They support a more in-depth understanding of the area and so a better definition of the research area, but do not have the aim of determining consensus on a topic area among participants. The methodological approach I adopted within the focus group stage was 'deliberative inquiry'. Kanuka (2010, p.102) suggests that a deliberative approach involves considering the topics as perceived by the range of stakeholders, allowing these to be challenged and uncover any misunderstandings as well as identifying shared positions.

A deliberative methodological approach is based upon the assumption that the decisions we make are socially constructed and are developed through our interactions with others. By bringing together a range of individuals, each with their own experiences and role in the delivery of pre-registration training, participants can react to and build upon the discussions of others in the group. Consistent and shared views surface from such deliberations allowing effective data to be collected in a group context. Such an approach also has the advantage of helping to eliminate false or extreme views (Kamerelis and Dimitriadis, 2010, p.553).

Focus groups were conducted with groups of each of the stakeholders; initially starting with a group of training officers and managers. Purposive sampling was adopted initially, identifying a suitable selection of individuals that meet the enquiry aims (Morse, 2012, p.237). The analysis of the questionnaire responses was used as an initial 'ice-breaker' tool to start the discussions. The dominant responses to each question posed in the questionnaire were discussed and opinions sought. For example, did they agree with the outcome, why do they think there are differences between stakeholder group responses? Five focus groups were conducted in total:

- Training officers and managers from a large teaching Trust (4 individuals)
- Academics supporting delivery of BMS programme (5 academics)
- Training officers and managers from a large teaching Trust (5 individuals)
- Students undertaking programme + registration training (5 individuals)
- Training officers and managers from a small NHS Trust (3 individuals)

As I discuss in Chapter Four, the selection of participants and the order in which these were conducted was guided through the process of concurrent data gathering and analysis and the need to answer questions raised within the data through the process of theoretical sampling described below (section 3.8.2).

Transcripts were made of each focus group and a copy of the transcript was sent to each research participant allowing respondent validation (Silverman, 2014 p93). This allowed them to check through the transcript and add any further comments, clarify any points they had made if they wished to, or ask for material to be removed if they felt they did not wish this to be disclosed. Resonance of findings is supported by this process, ensuring that interpretations and categories developed portray the fullness of the studied experience. Respondent validation also ensures that the substantive grounded theory developed makes sense to the participants of the enquiry and offers a deeper insight into their worlds (Charmaz, 2014, p.338). The importance of addressing ethical considerations and ensuring credibility of data has been previously outlined: respondent validation forms an important part of the ethical framework for this enquiry.

As I discuss in Chapter Four, transcripts were coded, line by line; 'naming segments of data with a label that simultaneously categorizes, summarizes, and accounts for each piece of data' (Charmaz, 2014, p.111). Coding allowed me to make analytic sense of the stories being provided by the participants and directed my choice of participants for each subsequent focus group. By identifying developing categories and returning to these with different groups the aim was also to develop a deeper and socially embedded understanding. By continually addressing themes with a range of stakeholders the 'situatedness' of findings is determined. Such an approach requires the researcher to acknowledge their own positionality, preconceptions, past-

history and beliefs and ensure that these do not guide interpretations and conclusions (Kamberelis and Dimitriadis, 2011, p.553).

Charmaz (2014, p.59) suggests that for the researcher, 'being fluent in pertinent procedural issues and technical questions helps them to engage the research participant and guide the conversation.' As I have outlined in 3.1.2 (insider researcher) my previous experience allows me to not only be aware of the issues affecting the laboratory environment but also means I know most of the participants in the enquiry. I am 'aware of the language' and I will hopefully be seen as an 'insider' investigating how the current programme impacts upon their role, rather than an 'external' person investigating their practice. Such engagement with the research area acts as an aid to authenticity of data (Edwards, 2002) and resonance with the research participants. Much of the organisational history and personal relationships are already known; a great deal of this would be undiscoverable to outsiders who have not worked in the profession. In addition, as I have no need to learn 'the language' or understand the 'politics' and participants are less likely to develop 'cover stories' around their practice (Clandinin and Connelly, 1998, p.3).

3.8.2 Theoretical Sampling

Theoretical sampling is described as seeking and collecting relevant data to elaborate and refine categories in emerging theory (Charmaz, 2014, p192). Although it is a variation of purposive sampling, unlike standard purposive sampling, theoretical sampling attempts to discover categories and their elements in order to detect and explain interrelationships between them. This approach requires sampling until no new properties emerge from the data gathered. The criteria, therefore, that I used for theoretical sampling differed from those I used for initial sampling. I selected

focus groups to provide further empirical data for the tentative ideas I had already developed, allowing the development of my categories further. This approach ensures a researcher is able to construct robust categories whilst also assisting in clarifying relationships between categories (Charmaz, 2014, p.200). As I moved on to undertaking interviews this approach was pivotal in supporting development of these theoretical categories.

3.8.3 Individual Interviews

Conducting individual interviews after the focus groups allowed me to develop greater analytical insights and enabled theoretical sampling Interviews were undertaken with individuals who I identified as key stakeholders to allow concepts to be considered in greater depth. Interviews were chosen at this stage since they can provide insights that are not available with larger focus groups and are known to be the most suitable approach when seeking rich data illuminating individuals' experiences and attitudes (Cohen, Manion and Morrison, 2007, p.351). The interview allowed an in-depth look in key areas at how the perceptions of individuals involved with preregistration training impact upon the construction and representation of curriculum knowledge and how these perceptions manifest in behaviour and delivery of training and learning in the pre-registration programme.

Interviews were used to probe for exceptions in agreements or explanations for disagreements. In taking such an approach, each interview I undertook was directed by findings in previous interviews and supported analysis of data whilst also allowing theory building as part of the research process; as highlighted, grounded theory requires study of and interaction with the data by moving through comparative levels of analysis (Charmaz, 2011a, p.361).

I focused upon specific points raised to shape the format of the interviews, linking these into previous data analysis. In CGT the 'lines between what constitutes data collection and what constitutes analysis blur' (Charmaz, 2014, p.93). Charmaz encourages the use of 'What' and 'How' questions to bring an analytic edge to the interview but to introduce 'When' to allow specific meanings and actions to be elicited (2014, p.94). Such an approach allows the researcher to encourage the participant to define terms and definitions and so elicit implicit meanings and tacit knowledge. Turning the participant's words into questions assists in 'drawing out' specific meanings and interpretations.

I found undertaking this stage of my enquiry to be quite a challenging experience. One of the problems I faced was ensuring that I could interview individuals who allowed theoretical sampling. I found that those who were willing to support this stage were often not those who I needed to enable me to gather further empirical data to allow the checking of hypotheses and to arrive at plausible explanations.

I initially started my interviews with a Training officer with a strong involvement in the BMS programme to allow me to investigate the categories developed in more depth but I also saw them as a 'good' starting point to help me to develop effective interview skills. I constructed a brief interview guide to use to direct the interview but wanted the research participant to lead the discussion once I had asked a few exploratory questions. Having an interview guide also allowed me to be reflexive in my approach; reflecting on the initial guide helped me to be aware of my own interests and assumptions before going into the interview (Charmaz, 2014, p.65). I found that using the guide directed my initial questions providing me with an initial scaffold to support the interview as well as ensuring that I did not omit any important

questions. Since the aim of the interview was to let the research participant provide in-depth insight into the specific key areas identified, I asked open questions that invited further discussion.

As with the focus group, interviews were all transcribed and a copy sent to the research participant for comment and to ensure that they were willing for all data to be included in the research enquiry. I continued to gather data until ‘saturation’ was met; gathering data no longer identified new properties in the core categories and I was able to make explicit distinctions about the experiences of the stakeholders and relationship to positioning (Charmaz, 2014, p213). This resulted in a total of twelve interviews which included three training officers, four students pre-placement, three students who had completed their placement and two academics involved in the BMS programme. Findings from each stage of the enquiry are detailed in Chapter Four, data analysis.

As previously outlined ethical guidance requires me to maintain participant anonymity. This was addressed by allocating codes and numbers to indicate the professional role of each participant but not the individual participant – the codes allocated are summarised in table 3.2 which also provides details of the participant groups within this enquiry.

Focus group		Participants	Code
1 – FG1	Large NHS Trust	Training manager – Training officer –	FG1TM FG1TO1 FG1T02 FG1TO3
2 – FG2	Academics	Academic Manager – Senior lecturer –	FG2AM FG2SL1 FG2SL2 FG2SL3 FG2SL4
3 – FG3	Large NHS Trust	Lab Manager – Training Officer –	FG3LM1 FG3LM2 FG3TO1 FG3TO2
4 – FG4	Students – full time and part in the workplace completing their pre-registration training	Part-time students - Full-time students -	FG4PT1 FG4PT2 FG4FT1 FG4FT2 FG4FT3
5 – FG5	Small NHS Trust	Training manager – Training officer –	FG5TM FG5TO1 FG5T02
Interviews			
1	Immunology	Training officer	I1TO
2	Microbiology and Histology	Placement Student (PS)	I2PS
3	Biochemistry	Placement Student (PS)	I3PS
4	Histology/Cytology	Placement Student (PS)	I4PS
5	Histology	Pre-placement (PP)	I5PP
6	Cytology	Pre-placement (PP)	I6PP
7	Microbiology	Pre-placement (PP)	I7PP
8	Microbiology	Pre-placement (PP)	I8PP
9	Cytology	Training officer	I9TO
10	Biochemistry	Training officer	I10TO
11	Academic	Role in supporting placements	I11Ac
12	Academic	No role in placement support/delivery	I12Ac

Table 3.2 – Participant coding to maintain anonymity

3.9 Chapter Summary

This chapter presented an overview of the methodology and methods employed in my research. I have presented the philosophical and theoretical aspects of grounded theory to establish the relevance of the ontological and epistemological underpinnings to my enquiry. I discussed how the work of Charmaz (2014) has been extremely influential to me whilst I have also drawn upon the approaches of other grounded theorists to develop my understanding and style.

As a scientist I have been more familiar with a quantitative approach to research which is probably why I chose a questionnaire initially as a method of gathering understanding of perceptions and experiences from a broad range of stakeholders. As a method of data gathering, the questionnaire does not fit naturally with the methodological approach chosen for this enquiry. However, I was very aware of research participants' perceptions of research and data gathering. I feel that by being able to gather quantitative data to present to the scientists as a 'tool' for simulating discussion in the focus group sessions the enquiry resonates with their position and encouraged further discussions. It also enabled me to gather perceptions and experiences from a much wider population than focus groups and interview alone would allow. In addition, it offered me what could best be described as a 'comfort blanket' as I grappled with straddling the paradigms and coming to terms with my positioning; addressing the positivists view of objectivity and subjectivity and moving to an interpretive paradigm where these are replaced largely by the concept of trustworthiness.

In the following chapter I discuss the processes used to analyse the data gathered from each step of my journey and how this led to the explication of the theoretical categories presented in Chapter Five.

Chapter Four – Analysis and coding of empirical data

4.1 Introduction

In the previous chapter I discussed the methodological approach adopted for this enquiry and introduced the methods used for data gathering. In this chapter I describe how I have drawn upon Charmaz's (2014) guidance on coding to define this data. She explains that coding is the pivotal link between collecting data and developing an emergent theory to explain data (Charmaz, 2014, p113). Coding is the process of asking analytical questions of the gathered data, from whichever source they are obtained. The aim of this process is to develop a greater understanding of the data and to direct subsequent data gathering to gain a more in-depth appreciation of the area being studied. Different terminology is used by different grounded theorists to describe the stages of coding. As I explain below, I used initial, focused and theoretical coding to define this process as outlined by Charmaz (2014, p.111). In addition I used clustering (Rico, 2000, p.17) as a process to help me to understand and organise the codes developed. Initially I clustered similar codes, I then clustered around processes which allowed me to look for actions, before identifying categories providing contextual insight and theoretical direction to my enquiry.

4.2 Data Analysis Methods

A range of different grounded theory methods are presented in the literature but all consist of a systematic approach to qualitative inquiry to allow the construction of theory (Charmaz, 2017). As discussed in Chapter Three I have drawn upon CGT acknowledging that data are always social constructions; they are not exact portrayals of reality (Charmaz, 2006, p.188). This approach to data analysis

distinguishes a constructivist approach from other methodological approaches. There is a construction and reconstruction of data generated with participants, as opposed to uncovering an emergent truth as outlined in classical grounded theory (Mills, Francis and Bonner, 2008). In the following sections of this chapter I provide a transparent outline of my approach to data analysis and how my findings were developed. In presenting details of this process I account for my theoretical interpretations presented in Chapters Five and Six.

4.2.1 Coding of data

Coding is the process of asking analytical questions of the gathered data, from whichever source. The aim of this process is to develop a greater understanding of the data and to direct subsequent data gathering to gain a more in-depth appreciation of the area being studied. Initial coding involves studying words, sentences, phrases or incidents to identify their analytic significance; codes set up a relationship with the data (Star, 2012, p.80). Charmaz recommends 'line-by-line' coding as an exploratory device allowing the researcher to become involved in the analysis and one which supports them to discard their pre-conceptions and see the data with fresh eyes (Charmaz, 2011b, p.172). Codes are produced as short labels and questions are posed as coding proceeds. As a result, coding assists in gaining new perspectives on the material and to focus further data collection which may lead to unforeseen directions (Charmaz, 2000, p.515). By generating action codes Charmaz (2000) suggests that these provide an insight into what people are doing, what is happening in the setting. This approach resonates with the aim of my enquiry and provides an appropriate approach to addressing the research questions. Focused coding involves condensing the codes already identified, highlighting what is believed to be important in the data by identifying categories (Charmaz, 2014,

p.140). It assists in synthesizing and conceptualizing data from the range of sources and gathered via each method. It supports comparative analysis further and allows patterns in the data to be identified as well as gaps indicating where further data is required. As a result focused coding allows the eliciting of information on the social situation being examined. Through focused coding, categories are identified and the possible relationships between these are then specified through the next stage of theoretical coding. In adopting a constructivist approach to grounded theory I recognise that data and analysis are created through an interaction between myself and the participants in the enquiry. The approach fosters an exploration of the experiences of the range of stakeholders involved in the BMS programme, arising from 'the interactive process and its temporal, cultural, and structural contexts' (Charmaz, 2000, p.524).

The method of theoretical abstraction and the terminology used, like other steps in GTM, is interpreted and defined differently by different researchers. My own approach to this final stage of coding drew upon the constructivist approach as defined by Charmaz (2014, p.148). This stage supports the application of an analytic frame to the data and allows the development of a theoretical framework for the overall grounded theory. Theoretical codes, therefore, allow the researcher to conceptualise how the focused codes relate to each other as hypotheses which can be integrated into theory. This stage is strongly supported through memo writing as described below.

4.2.3 Constant Comparative analysis

Constant comparative methods are used to establish analytic differences and so allow comparisons to be made at every level of analytic work (Charmaz, 2014,

p.132). Codes are compared to codes, codes to categories and categories to categories allowing an inductive approach. Abductive reasoning also occurs at all stages of analysis but is an essential feature of constant comparative analysis to support theoretical integration (Birks and Mills, 2011, p11). In understanding the positioning of the range of stakeholders involved in the BMS programme the constant comparative method was instrumental in allowing me to develop a conceptual depiction of this derived from group and individuals' narratives.

4.2.4 Memo Writing

Memo writing is a continual process that 'helps to raise the data to a conceptual level and develop the properties of each category' (Holton, 2012, p.281). In doing this, memos also guide the next steps in further data gathering, coding and analysis. I maintained a reflective journal throughout the data gathering and analysis process which also contained my memo writing. My reflective journal evolved throughout this enquiry from notes and jottings, highlighting possible ideas or areas for further investigation (either in the literature or via additional data gathering) to in-depth reflexive conversations with myself looking at connections in the data to provide theoretical insights. Memo writing develops existing categories, examining codes and an understanding of the relationships between categories. Clarke (2005, p.85) describes them as 'intellectual capital in the bank'. They form an intrinsic feature of the iterative approach of CGT encouraging the researcher to stand back and focus on the codes, dissecting and comparing them allowing links to be formed. It is a way of standing back from the data and taking stock to allow actions and meanings to be conceptualised (Charmaz, 2014, p.164).

My reflective journal included notes of conversations that I had with a range of individuals as I met them as part of my everyday life: lecturer, personal tutor to pre-registration trainees, placement tutor, member of local BMS committees. This approach supported triangulation of the data collected; my observations in practice acting as confirmation of my analytical questioning of the data and to support a deeper understanding of their meaning. I continually reviewed entries in my journal, acknowledging changes in direction or the impact of new influences upon the direction of my enquiry and my previous perceptions. Such memo writing allowed me to immerse myself in the data and 'experiment' with the emerging themes (Charmaz, 2014, p.162). I found that my scientific background aligned naturally to an approach that used flow-charts and diagrams to link data from a range of sources, supporting me to make conceptual links and compare perceptions of situations.

The following section provides details of stage one of data analysis and explains how this routed my work in an analytic direction in the early stages of the research. In clearly presenting the evolution of my enquiry's direction I support the credibility of my findings.

4.3 Stage One - Document analysis and questionnaire

Document analysis involved reviewing articles published in *The Biomedical Scientist,* a monthly publication produced by the professional body – Institute of Biomedical Science. Articles are published on a wide range of subjects including education, laboratory practice, training and management as well as members' correspondence. This professional publication provides a narrative to reflect current practice and developments in the profession of biomedical science for its readers. Details of the number of articles retrieved and coded post initial review is outlined in table 4.1. In

addition to reviewing the professional body publication minutes of local training meetings (University Employer Liaison Committee [UELC]) and Biomedical Science Training and Workforce Planning Group [BMST&PT] were reviewed and coded. Minutes were from meetings I had attended in my professional role between 2009 and 2013: two meetings per year for each group.

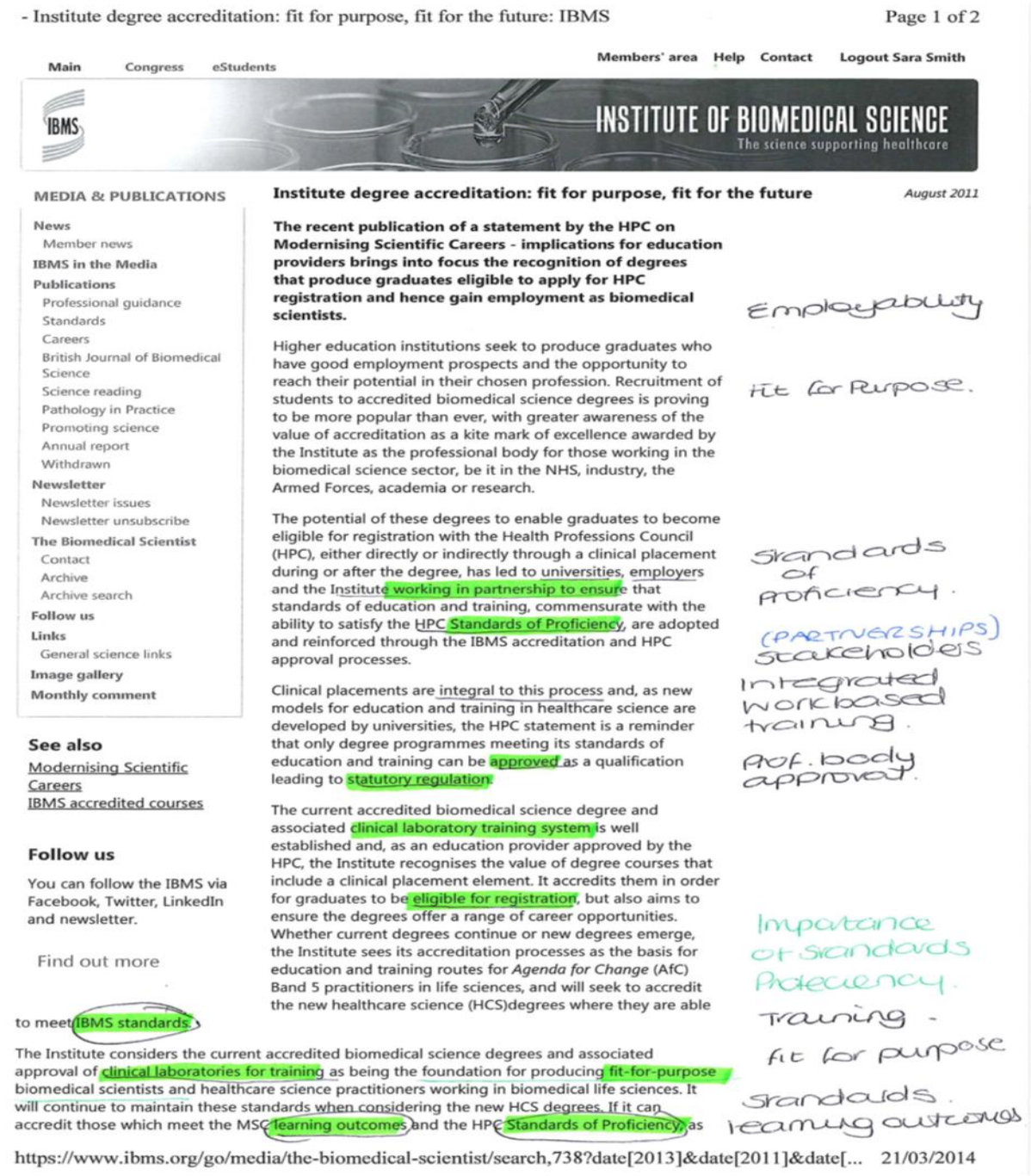
Archive search	Pre-defined Categories in search engine	No. of articles identified
Initial electronic search	General Science, History, Professional and Workforce, Media and Publications, Quality, Miscellaneous, Careers, International, Careers, Instrument Training, Information Technology, IBMS, Education and Development and Management	625
All articles were reviewed to identify those relevant to the research area. General articles such as those on science or disease biology were excluded		
After manual review	Topics covered in articles were placed into thematic categories: Practitioner registration Portfolios Training Education for BMSs Workforce planning	69

Table 4.1 Summary of articles identified from The Biomedical Scientist Archive search

The aim of document analysis was to provide an initial or primary 'wide-view of the landscape' before bringing 'specific scenes' into focus. Document analysis supports the next stage of data gathering by allowing the questionnaire to be set in the context of current dialogue on BMS training and development in the general BMS community and investigate the developing categories in greater depth.

Initial coding was used to identify developing categories within the discussions provided as outlined in figure 4.1 (*The Biomedical Scientist*) with excerpts of coding demonstrated in table 4.2 (*The Biomedical Scientist*) and table 4.3 (Minutes from meeting). Key words or statements were highlighted with the aim to define implicit

meanings and actions. As discussed, the initial aim for this stage of the enquiry was to identify developing categories to provide initial direction for construction of the questionnaire and subsequent data gathering and analysis:



- Institute degree accreditation: fit for purpose, fit for the future: IBMS Page 1 of 2

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Institute degree accreditation: fit for purpose, fit for the future *August 2011*

The recent publication of a statement by the HPC on Modernising Scientific Careers - implications for education providers brings into focus the recognition of degrees that produce graduates eligible to apply for HPC registration and hence gain employment as biomedical scientists.

Employability

Higher education institutions seek to produce graduates who have good employment prospects and the opportunity to reach their potential in their chosen profession. Recruitment of students to accredited biomedical science degrees is proving to be more popular than ever, with greater awareness of the value of accreditation as a kite mark of excellence awarded by the Institute as the professional body for those working in the biomedical science sector, be it in the NHS, industry, the Armed Forces, academia or research.

Fit for Purpose.

The potential of these degrees to enable graduates to become eligible for registration with the Health Professions Council (HPC), either directly or indirectly through a clinical placement during or after the degree, has led to universities, employers and the Institute working in partnership to ensure that standards of education and training, commensurate with the ability to satisfy the HPC Standards of Proficiency, are adopted and reinforced through the IBMS accreditation and HPC approval processes.

Standards of proficiency.

(PARTNERSHIPS) Stakeholders

Integrated work based training.

Prof. body approval.

Clinical placements are integral to this process and, as new models for education and training in healthcare science are developed by universities, the HPC statement is a reminder that only degree programmes meeting its standards of education and training can be approved as a qualification leading to statutory regulation.

The current accredited biomedical science degree and associated clinical laboratory training system is well established and, as an education provider approved by the HPC, the Institute recognises the value of degree courses that include a clinical placement element. It accredits them in order for graduates to be eligible for registration, but also aims to ensure the degrees offer a range of career opportunities. Whether current degrees continue or new degrees emerge, the Institute sees its accreditation processes as the basis for education and training routes for *Agenda for Change* (AfC) Band 5 practitioners in life sciences, and will seek to accredit the new healthcare science (HCS)degrees where they are able to meet IBMS standards.

Importance of standards Proficiency. Training - fit for purpose

The Institute considers the current accredited biomedical science degrees and associated approval of clinical laboratories for training as being the foundation for producing fit-for-purpose biomedical scientists and healthcare science practitioners working in biomedical life sciences. It will continue to maintain these standards when considering the new HCS degrees. If it can accredit those which meet the MSC learning outcomes and the HPC Standards of Proficiency, as

Standards. learning outcomes

https://www.ibms.org/go/media/the-biomedical-scientist/search,738?date[2013]&date[2011]&date[... 21/03/2014

Figure 4.1 – Coding of document from The Biomedical Scientist.

Coding of excerpts from *The Biomedical Scientist*	**Developing categories**
..much could emerge from the review and have major implications for the pathology community as a whole…these include payment by results, the implementation of practice-based commissioning.. (Newland, 2008, p.22) *…Pathology should not be viewed simply as a commodity but as offering education and advice which future staffing levels should reflect (Lavender, 2008, p.700)* *..workforce planning should be based on process mapping of laboratory procedures. Workforces need to be configured with regard to competence, skills and grade…consolidated services will allow pathology to share and pool staff. (Bamber, 2010, p.558)*	Workforce and capacity for training Professional practice
…..laboratory managers in UK pathology departments are making clear and deliberate choices to employ graduates from co-terminus/integrated applied biomedical science programmes (Pitt and Cunningham, 2010, p.276) *[Accreditation] Ensures qualification is fit for purpose as an academic qualification acceptable for statutory regulation (Wainwright, 2011, p.110).*	Degree fit for purpose
Success will depend on appropriately trained trainers supported by sufficient protected time to deliver training…not an excuse to starve training of the support it requires as to do so would be to jeopardise the future workforce skills base, which ultimately would be to the detriment of patient care (May, 2011, p.2).	Training and support for training officers Capacity for training
..competence could be assessed in several different ways. For example, photographs, case studies, certificates of attendance, reflective learning sheets….written assignments (Martin,2009, p959).	Registration portfolio Training for the portfolio

Table 4.2 Excerpts of coding form The Biomedical Scientist

Coding of extracts from minutes	Developing Categories
….Loss of some posts along with downgrading of other posts will put a lot of pressure on placement availability *(UELC, December, 2011).*	*Workforce and capacity for training*
….impact of general staffing resources throughout the region but also on training and training posts (UELC, April, 2012). *…[new models of service] will impinge not only on general staffing resources throughout the region but also on training and training posts (UELC, April, 2012).*	*Workforce and capacity for training*
…decreased numbers of staff and increased need to support placements which is stretching resources (BMST&WP, March, 2010).	*Workforce and capacity for training*
*..the group recommend that the current BSc is fit for purpose….and will commit to support the next three years and review annually (*BMST&PT, *March, 2011).*	*Degree fit for purpose*
*..the group remain committed to the current model [BMS training]….the existing model has proven ability (*BMST&PT, *April, 2012).*	*Degree fit for purpose*

Table 4.3 Examples of coding from minutes of regional training meetings

Four developing categories were emergent from the document analysis: *The portfolio, Workforce and capacity for training, Support/Training for trainers, Degree Fit for Purpose* as depicted in figure 4.2.

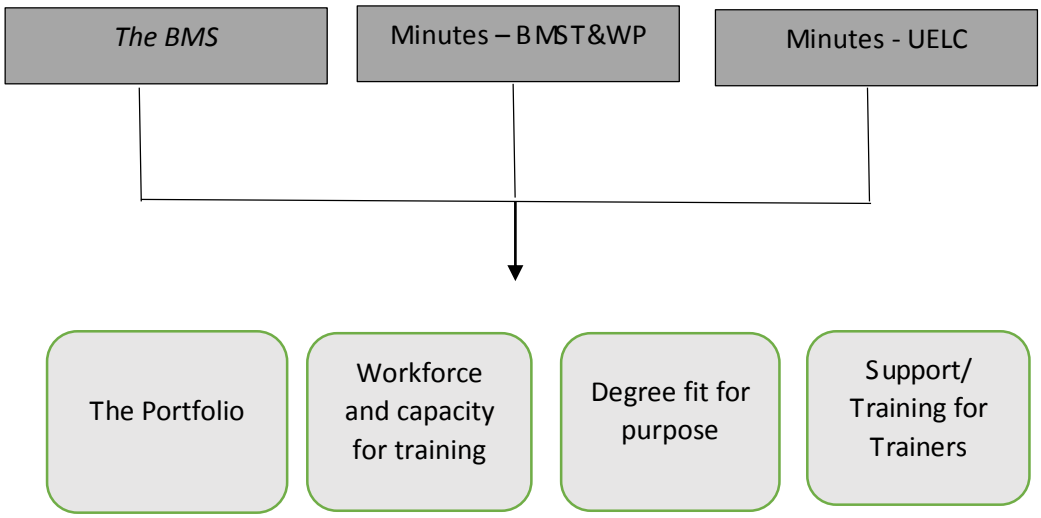


Figure 4.2 Summary of developing categories from Document Analysis

As discussed in Chapter three, the categories identified from document analysis were drawn upon to support the development of the questionnaire. The questionnaire had two roles in my enquiry:

- Gather a breadth of ideas from the contemporary field of BMS drawing upon each of the stakeholder groups
- Provide a 'tool' to act as an 'ice-breaker' in focus group sessions and to stimulate discussion in the key areas identified in the first stage of data gathering. As scientists, the stakeholder groups were seen as being more responsive to being presented with quantitative data relating to these key areas. The idea was not to present this data as fact but to stimulate discussion and allow a deeper understanding to be sought; allowing participants to construct meaning from the data.

Figure 4.3 and Table 4.4 summarise the range of stakeholders who responded to the questionnaire. Stakeholder groups, participant disciplines and NHS Trusts were all represented by the responses allowing a variety of experiences and

views to be drawn upon.

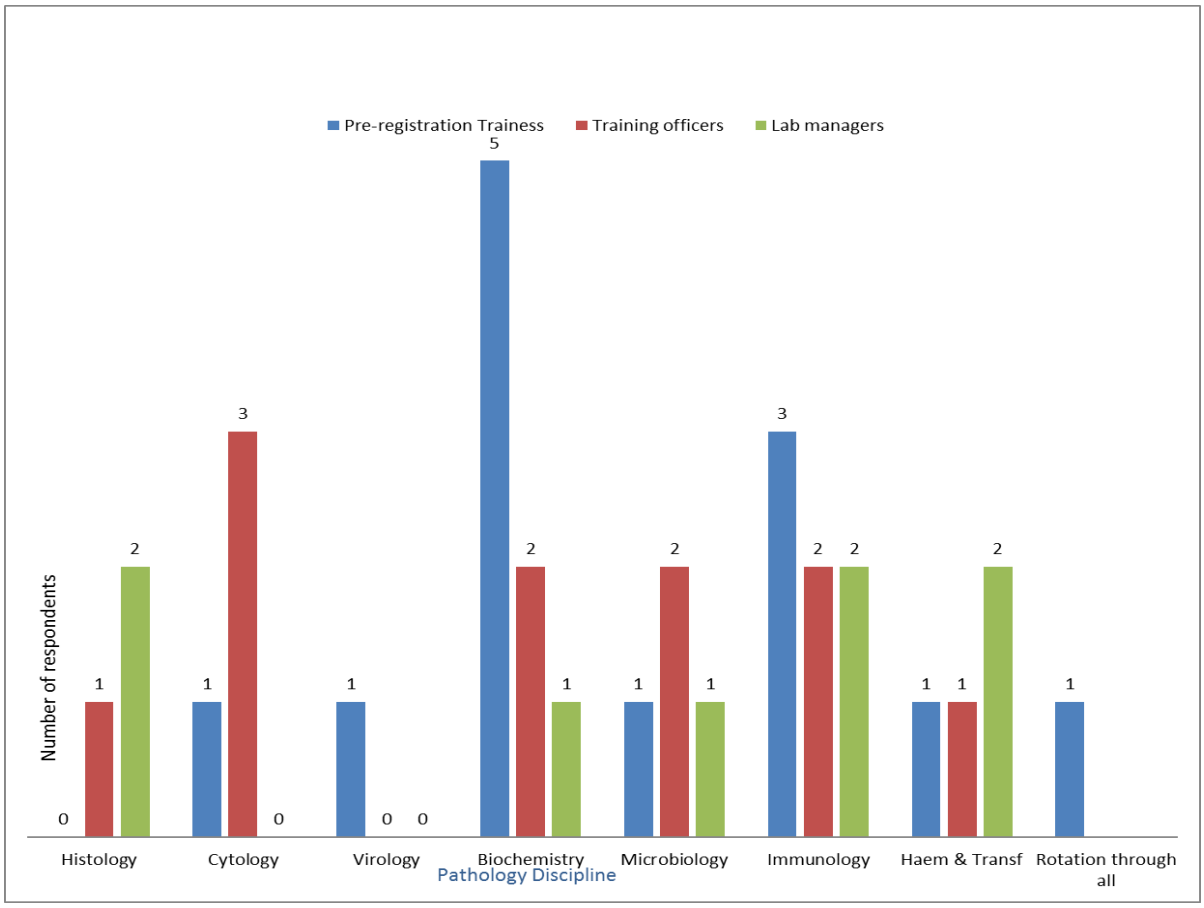


Figure 4.3 Summary of responses to questionnaire by each laboratory based stakeholder group and discipline

Responses were received from 6 of the 10 NHS Trusts surveyed. The departments range in size and include large regional training centres and small specialised laboratory services. In total 75 responses were received from all of the stakeholder groups and these are summarised in table 4.4. Since the fundamental role of this step of data gathering was to identify developing categories to inform further empirical data gathering for analysis, evaluating the response rate to the questionnaire is not of value to this enquiry. In section 4.5 I discuss the concept of 'data saturation'.

Respondents	Number
First year students	20
Final year students	16
Pre-registration Trainees (workbased portfolio)	13
Training Officers (TOs)	11
Laboratory Managers (LMs)	8
Academics	7
TOTAL	**75**

Table 4.4 – Summary of all questionnaire participants

Responses were analysed into tables and graphs. I performed a basic analysis to determine whether the responses supported findings from document analysis to assist in developing the areas of investigation and also to identify additional potential areas to pursue. A full summary of the questionnaire analysis is provided in Appendix 3. I included this analysis since it was also used as an 'ice-breaker tool' to initiate comments and reflections in stage two of this enquiry. Hiles and Čermák (2007, p.7) call for researchers to be clear and open about the methods used, and the assumptions being made. By providing a copy of the questionnaire analysis I clarify my approach and how questioning within the focus groups was initially framed. As I outline below, responses to the questionnaire reinforced the importance of the developing categories identified by the document analysis as well as highlighting additional areas to direct the inquiry during the second stage. Figure 4.5 demonstrates these additional areas identified for further discussion and analysis in stage two. An abundance of data was obtained from the questionnaire repsonses.

The following section draws upon the analsysis of data from the questionnaire to demsontrate how the additional concepts of time, staff grades and appprioriate training were identified. I also highlight identification of negativity around the role of the programme in developing a student's knowledge of the discipline and in preparaing them for employment. These were important areas that I questioned around in the focus groups.

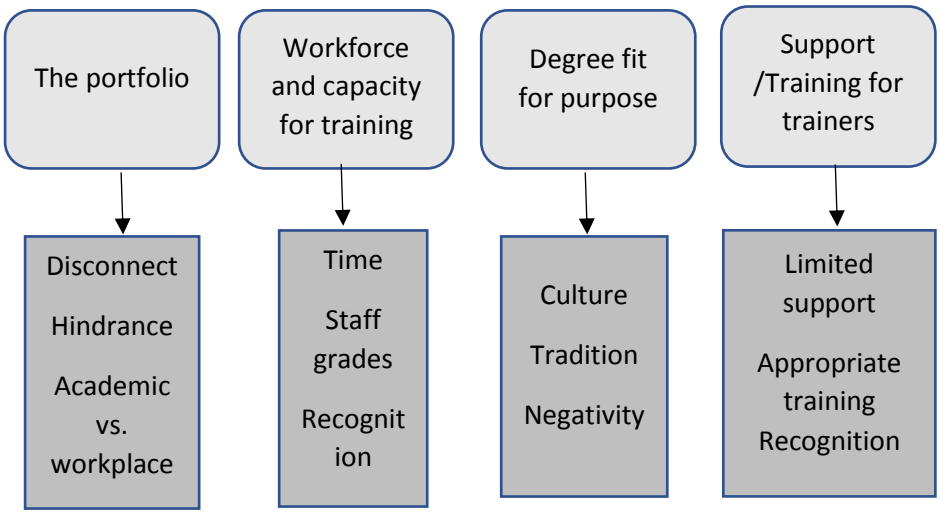


Figure 4.5 Additional concepts identified by the questionnaire within the key areas

Potential barriers to pre-registration training in the workplace are identified in the spider chart (fig. 4.6). Each of the potential 'barriers' was evaluated by respondents as to whether it never acted as a barrier, occasionally, most of the time or always. Nearer the edge of the spider's web represents the greater response. The diagram shows that many of the factors identified including the portfolio, staffing levels and support for training occasionally act as barriers. Staffing levels are considered a major barrier with this factor having an impact 'most of the time'. Nearly half of the respondents identified time as being a barrier 'always'.

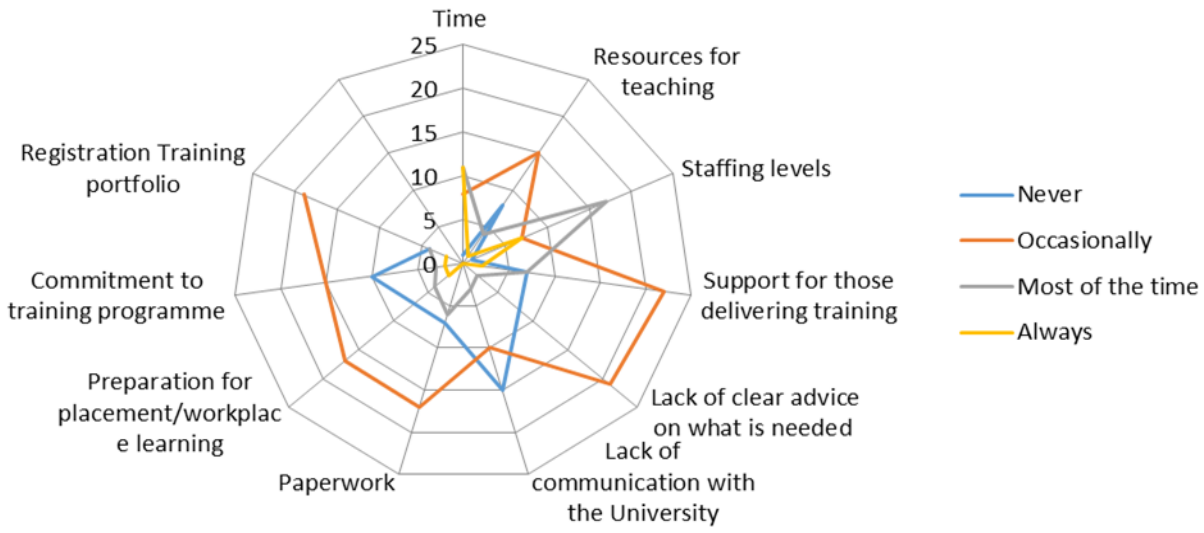


Figure 4.6 Potential barriers to successful pre-registration training (TOs, Lab managers, Students)

A lack of time to support the student was identified for training officers, laboratory managers and academics as shown in figure 4.7.

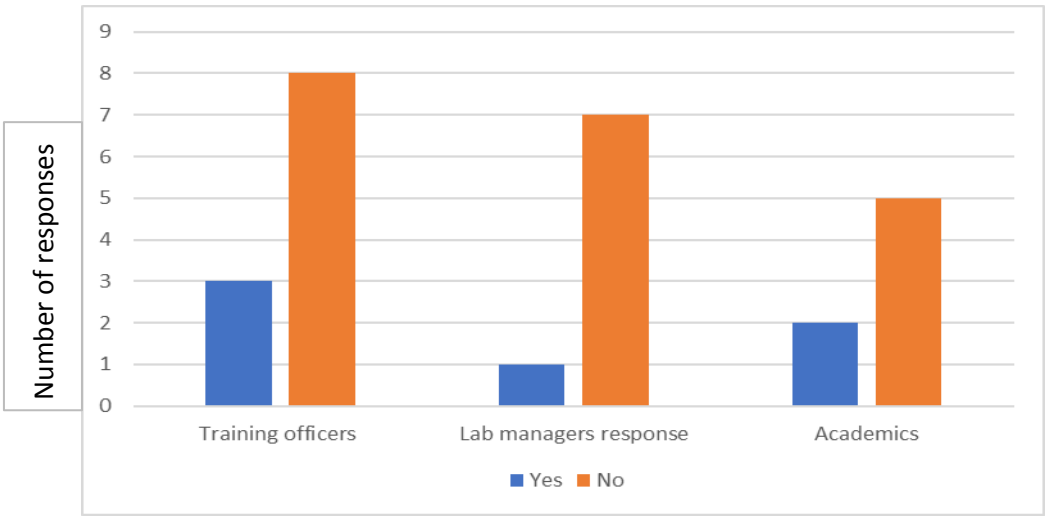


Figure 4.7 Responses to the question 'do you have time allocated to support training of students

In addition, a lack of support or training to undertake the role was suggested by responses from these groups as demonstrated in figures 4.8- 4.10.

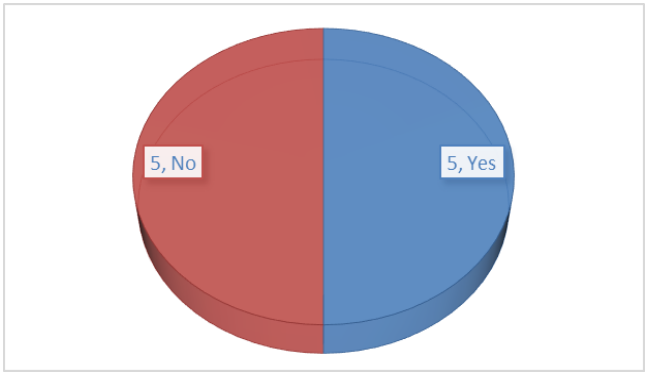


Figure 4.8 Summary of responses from Laboratory Managers to the question 'Have you received support or training for delivering pre-registration training?'

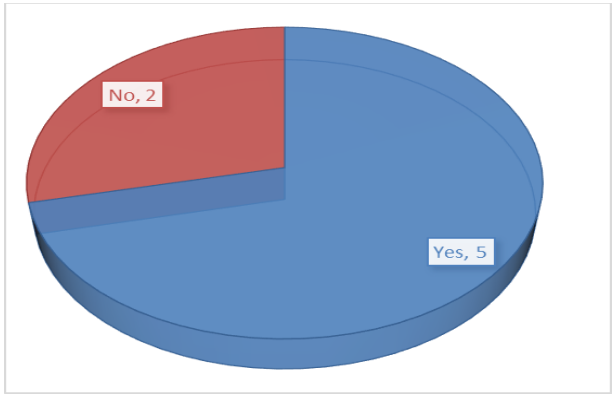


Figure 4.9 Summary of responses from Training officers to the question 'Have you received support or training for delivering pre-registration training?'

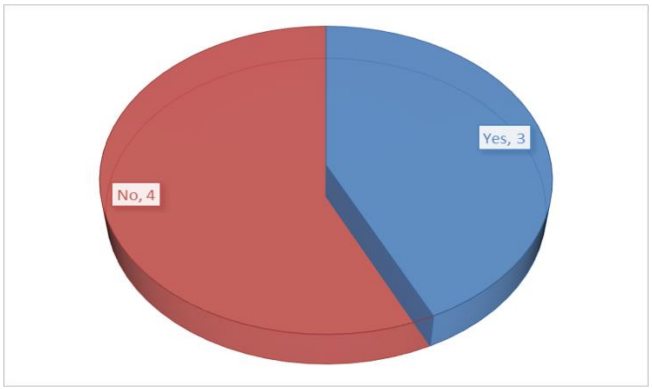


Figure 4.10 Summary of responses from Academics to the question 'Have you received support or training for delivering pre-registration training?'

The pie charts suggest that not all of those involved in delivering pre-registration training felt that they had received the required support for this role. In addition, free text responses suggested that the support provided was often in-house and generic. This highlighted an area for further questioning in the next stage. In addition, a very interesting finding was around the involvement of a range of staff grades in supporting training within the workplace (figure 4.11).

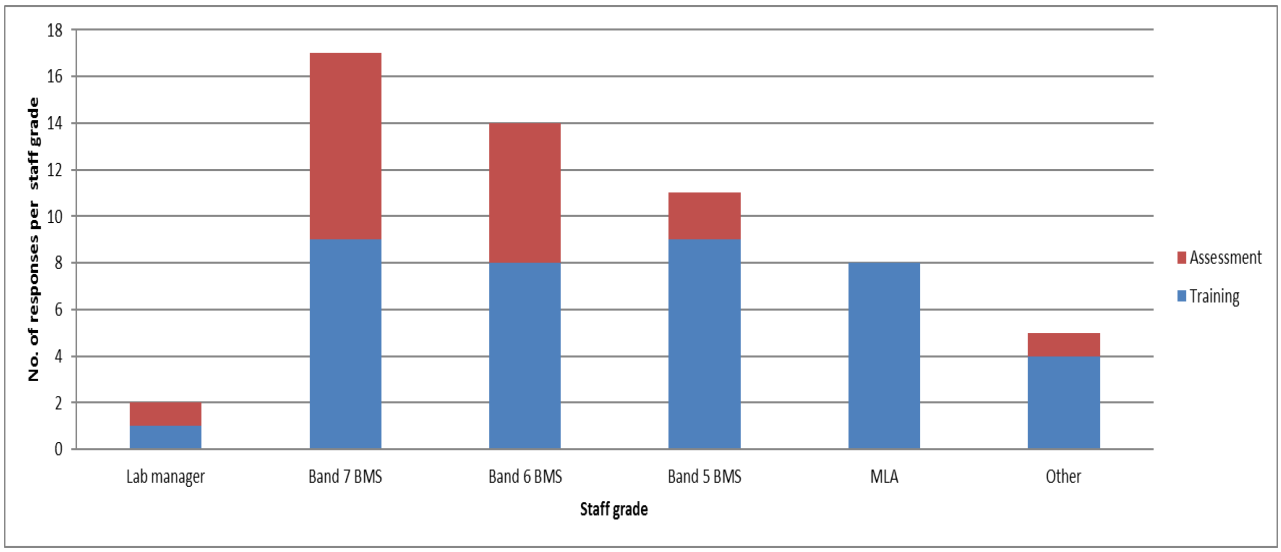


Figure 4.11 Who delivers training and assessment in the workplace (responses from 10 training officers)

The responses were consistent between student, training officers and laboratory manager groups. I used questioning in the focus groups to identify why delegation occurs and the potential impact that this has on both experiences and perceptions of the stakeholders as well as upon development of capability in the student.

Finally, one of the developing categories identified in document review was that the role of the current approach to pre-registration was 'fit for purpose'. I questioned each of the stakeholder groups in this area, asking about their perception of the role of the academic HE delivered portion of the programme and the work based laboratory delivered portion. I found a wide difference in perceptions between each of the stakeholder groups. These findings are summarised in figures 4.12 to 4.15.

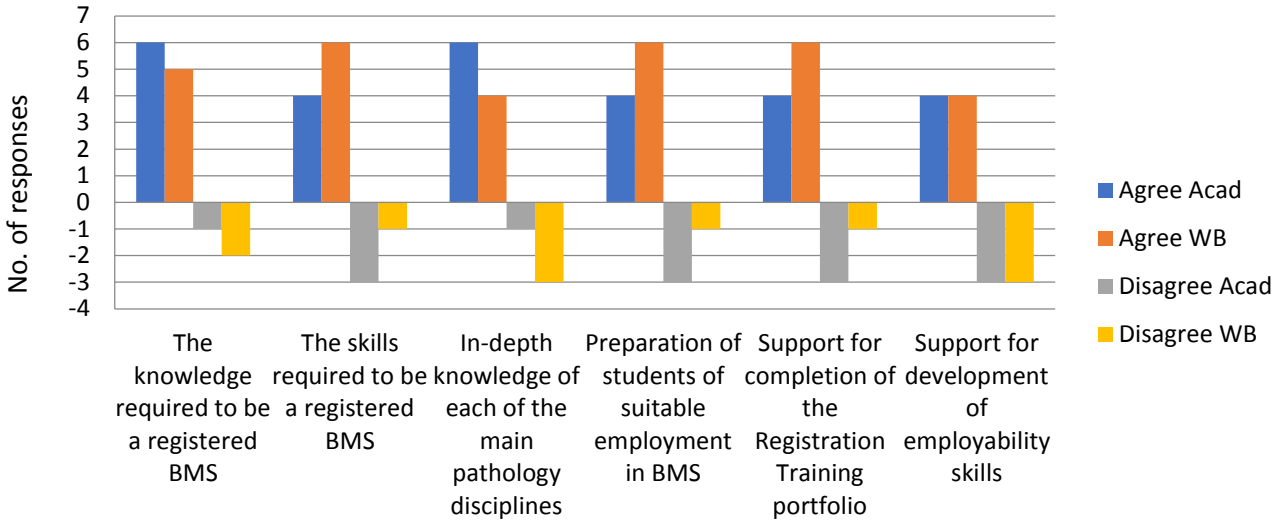


Figure 4.12 Perceived role of pathway to registration of academic and work based curriculum – Academic stakeholder group

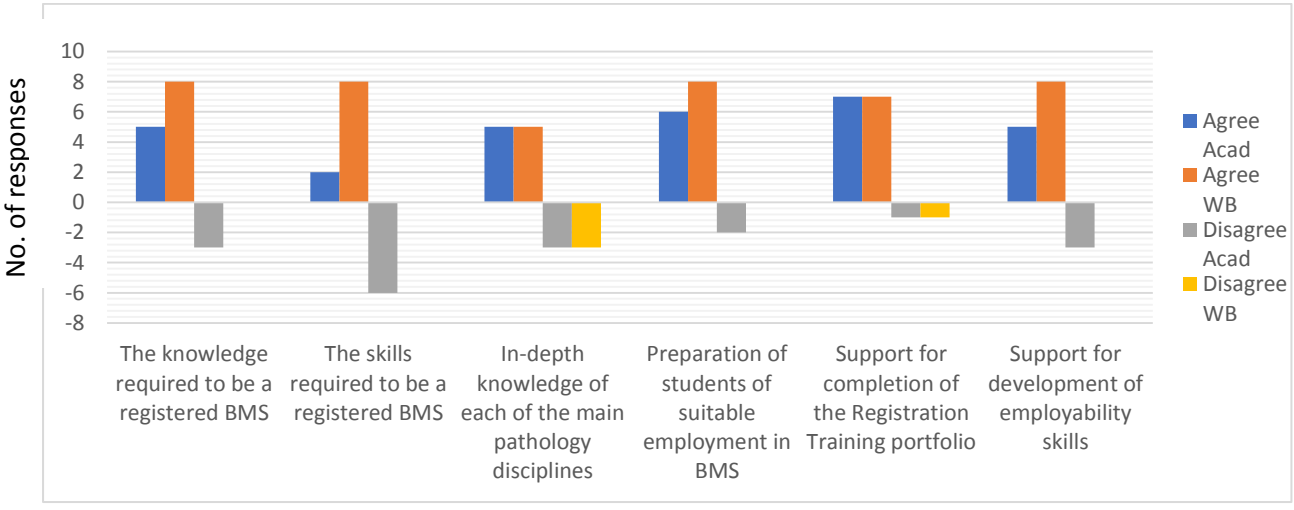


Figure 4.13 Perceived role of pathway to registration of academic and work based curriculum – Training officer stakeholder group

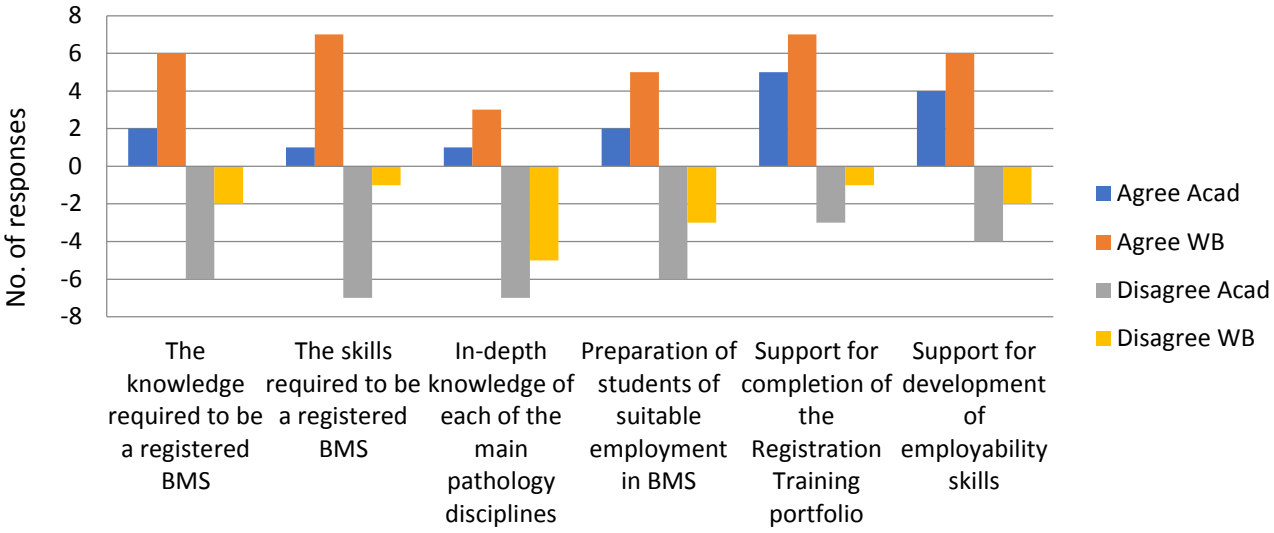


Figure 4.14 Perceived role of pathway to registration of academic and work based curriculum – Laboratory Manager stakeholder group

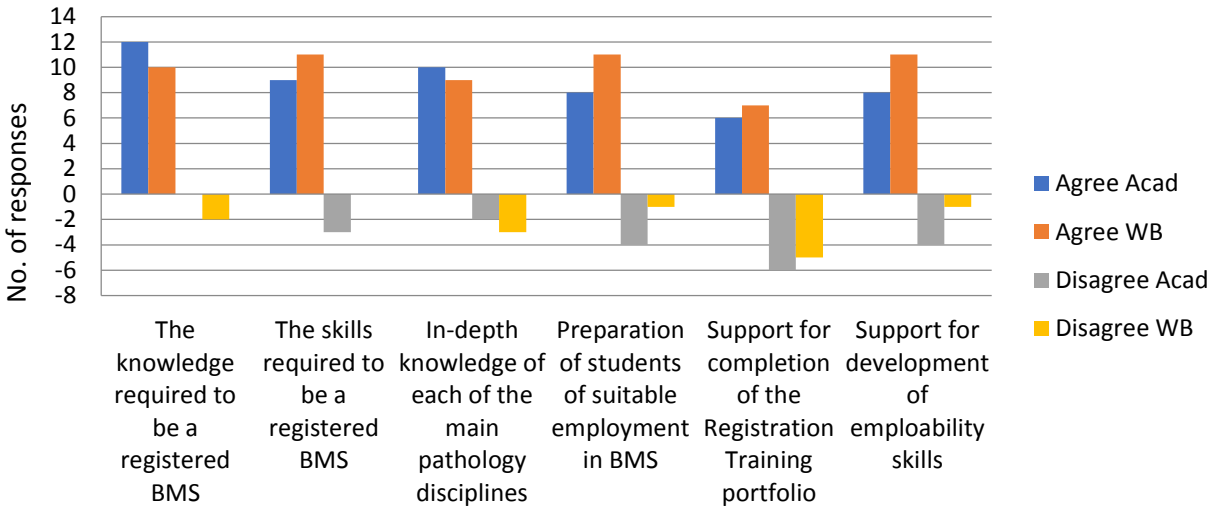


Figure 4.15 Perceived role of pathway to registration of academic and work based curriculum – Pre-registration student stakeholder group

The number of individuals who agreed with the proposed statement is shown as a positive value on the graph whereas those who disagreed represents a negative value. My own interpretation of these responses suggests a negativity towards the role of the academic knowledge provided by the award and the awards role in preparing the student for employment in the laboratory among the laboratory

manager group. However, a disconnect exists since the laboratory managers perceive the award as supporting completion of the portfolio. As identified in Chapter Two, completion of the registration training is identified as confirmation that an individual has gained both the knowledge and skills to be registered as a biomedical scientist and practise under this protected title. This highlighted an important area for further questioning in the focus groups to understand why the award is seen as enabling completion of the portfolio but not producing a capable practitioner.

4.4 Stage two – Focus groups and Interviews

Using the voices of those involved in the programme and directed by the research questions I undertook analysis of the transcripts. Stage one was critical for ensuring that I did not restrict data collection to current discourses identified in the literature review but remained open to development of new directions. This stage provided new areas for questioning as highlighted in the previous section.

4.4.1 Development of initial codes

Line by line analysis was initially used to name segments of the data with a label to account for each piece of data to make analytic sense of the stakeholders' discussions. Codes were produced as short labels defining the data or recounting the action of the line in concise terms. *In vivo* coding which uses a word or short phrase taken from the data itself was an important feature of this process. These codes represent colloquial interpretations of phenomena and are taken directly from the language of the field of investigation (Bohm, 2004, p. 271). *In vivo* codes are therefore derived from the stakeholders themselves and so capture and accentuate experiences in a way that is meaningful to them (Charmaz, 2014, p.134) such as 'tick-sheet approach', 'if you can fit it in' and 'the lab comes first'. They are

characteristic of social worlds and organisational settings and so reflect assumptions, actions and imperatives that frame action. By studying these codes I am in a stronger position to anchor my analysis within the participants' worlds and this provides both greater resonance and usefulness to my enquiry findings.

As I progressed through the enquiry, gathering data, coding and analysing it, I continually returned to my previous coding and reflected upon it considering subsequent data gathering and analysis. This was particularly helpful when comparing coding from the initial stage of data gathering using document analysis with coding from stage two. Revisiting coding encourages a review through a different lens and provided new interpretations of the stakeholders' discussions. This process was essential in supporting both development of my understanding of the data and a more reflexive approach. It supported greater sensitivity towards stakeholders' experiences and how this impacts upon their positioning. I could ask questions in interviews based upon emerging codes to develop a greater understanding and allow development of theory.

The first focus group session consisted of training officers and a training manager from one of the large Trusts in the region. The session started by presenting the groups with the questionnaire summary (Appendix 3) and asking for their thoughts on the findings. This provided a good starting point and allowed greater exploration of the questionnaire responses and participants' perceptions. The coding and analysis of this initial focus group directed the next focus group to enable a deeper understanding of the data as well as gathering of further empirical data. Table 4.4 provides details of how I initially coded the transcripts from the focus groups allowing the large amounts of data gathered to be condensed into descriptors of actions to allow me to start to compare the data.

Transcript excerpts	Initial coding
FG1TO1: The current situation is not really acceptable is it? Anybody who is delivering training should have received some form of formal support themselves to do training…. It could be just being able to attend the training the trainer events that are put on by Universities. We do learn a lot from those. [training].I think it can be used very much as a tick box exercise and a case of just signing it off. It depends how you approach it and how much time you have. And this is purely up to individual disciplines, and training officers	Training not formalised Training role not recognised Tick-box approach Signing-off actions Not having time
FG1TO3: I feel that the role should be properly recognised.. As a training officer you are also expected to work within the lab and the training seems to be 'if you can fit it in'. I appreciate that training is very much at the bench as you are doing tasks but I don't think we are giving it as much as we could quality wise. This is possible reflected in the capability of the 'end product' – the person who you have just trained.	Training role not recognised Training as an add-on Fitting training into time frame
FG3LM1: [provision of supportive training environment] well we could if we didn't do any work – no lab tests today – we are training	Recognising role of training Limited time for training Training as an add-on

Table 4.5 Example of initial coding from the training officer and laboratory manager focus groups

Undertaking line by line coding of the stakeholder narratives and interactions allowed me to develop a deeper understanding of individuals' perceptions and their actions. For example, in table 4.5 three features that were identified early in the coding process are demonstrated; lack of time for training (green), lack of recognition and support for role (yellow), approaches adopted for learning and teaching (blue). Coding of the focus group with the students also highlighted the lack of time for training and the 'add-on' nature of training in the workplace. It reinforced and

developed the coding of the transcripts from the other stakeholders as well as introducing different perspectives. For example, 'lack of time' for training was also identified as resulting from a 'lack of staff' available for training as well as 'heavy workload'. The 'lack of formal support' for their role acknowledged by the training officers was identified by students as a 'lack of clarity' around training and requirements for training resulting in the code 'Training not fit for purpose' (table 4.5).

Excerpts from transcripts	**Initial coding**
FG4FT1: Workload always takes preference to the training – it has to be done, it has to be reported at a certain time…to spend time training someone and leaving that workload is just not going to happen.	Training as an add-on
FG4FT2: I don't think that the staff are really that clear about or let you know what you are expected to be able to do.. …some departments just do not have the time or the staff [to support training]	Training not adequate/fit for purpose Limited time for training Limited staff for training
FG4FT1: I got trained in the lab and my portfolio was independent… I was learning techniques to gather evidence for my portfolio..	Separation of training for roles vs. portfolio
FG4FT3:.. we get trained by MLAs or other staff who don't even know what is the principle behind the test…they just have to follow the steps and to look at these specific things so this is what they are going to pass on to you….if it is a tick-box person then there is a problem	Training role not recognised – use of MLAs Training not adequate/fit for purpose Tick-box approach

Table 4.6 Example of initial coding from the student stakeholder focus groups

The academic focus group and interviews provided a different lens through which to view the programme compared to the work based stakeholders. The student focus group formed a link between these two very different environments. Comparative analysis within and between these groups provided more nuanced understanding of the data to allow greater conceptualisation as discussed below.

Data analysis guides further data gathering. As I started to develop early conceptual categories I was directed to undertake an additional focus group which included Training officers and laboratory managers from a smaller pathology department to determine whether laboratory size impacted upon my analysis. As I moved onto conducting interviews coding and categories were refined and focused further. This process assisted in directing both how I approached the interviews which were undertaken after the focus groups, as well as who I approached for interview. I had not initially intended to interview students who had not yet been out onto work placement. However, to allow me to elaborate and refine the properties of the categories emerging from the data I decided to include this group to assist in developing a better understanding of the perception and approach to the registration portfolio of all students. Coding of the transcripts from the additional focus group and interviews enabled me to compare the narratives within and between individuals within different stakeholder groups to provide a more nuanced understanding of the experiences and perceptions of individuals in different settings and stages of the programme. This process supported me to identify subtle meanings and to develop new insights and a deeper understanding of the empirical world by unifying ideas analytically to allow further sorting and selecting. Although a very time consuming and involved process it assisted in fostering originality of my enquiry's findings

4.4.2 Focused coding

The initial analysis and coding of the data provided possible paths for further analysis. As I gathered and coded more data I focused the coding process. Focused coding involves condensing the codes already identified, highlighting what I believe to be important in the data; identifying categories and developing theoretical

categories (Charmaz, 2014, p.140). This process assists in synthesizing and conceptualizing data from the range of sources and gathered via each method. It supports comparative analysis further and allows patterns in the data to be identified as well as gaps indicating where further data is required.

Focused coding allowed the eliciting of information on the social situation being examined and was an iterative process. Categories were created and amended as I carried on with data collection and coding – immersing myself in the data and continuously returning to each transcript. Figure 4.16 and 4.17 (Memo extracts) provide an insight into the immersive and iterative nature of this process and represent only a 'snap-shot' of the practice of coding. It was through this process of focused coding that significant categories were identified and the possible relationships between these were then specified through the next stage of theoretical coding to develop theoretical categories which I discuss in the next section.

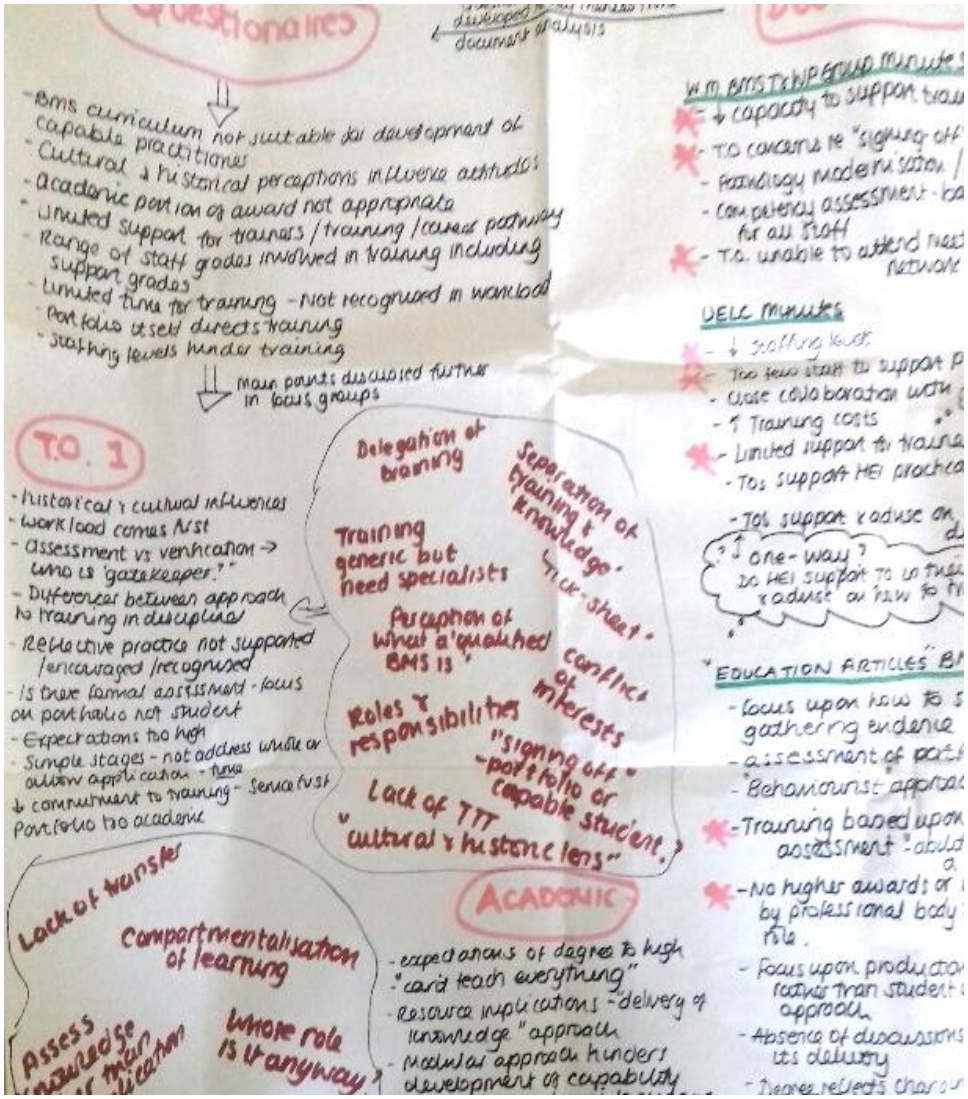


Figure 4.16 – Memo of initial and focused code development

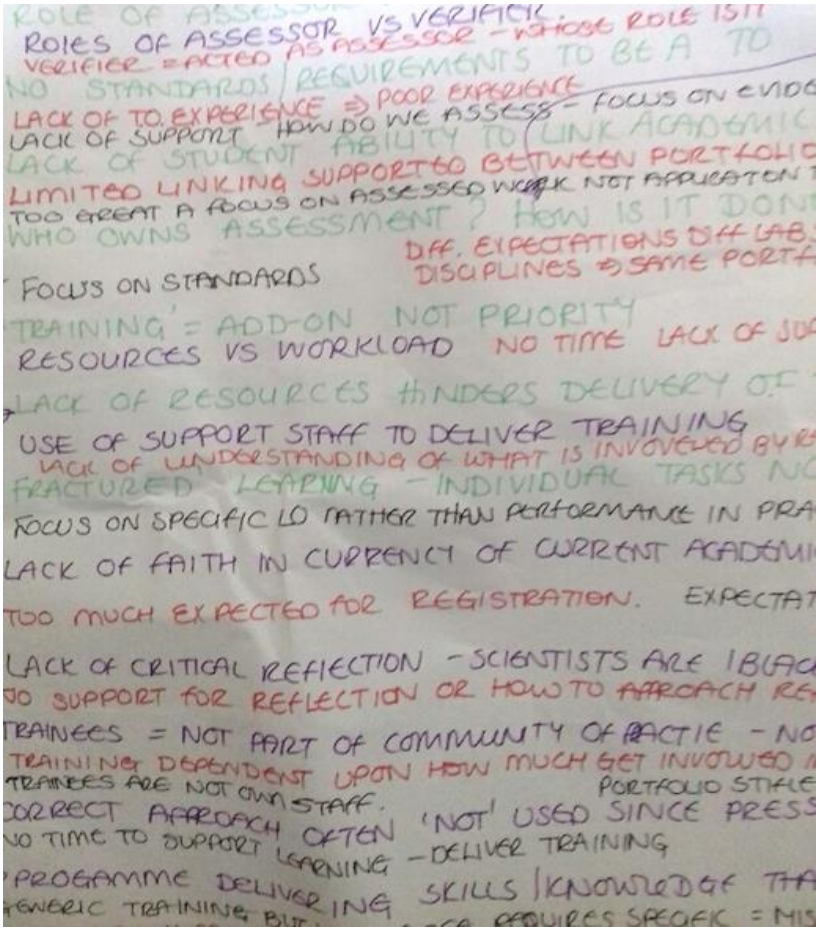


Figure 4.17 Memo extract of focused coding

In addition, observations jotted down after placement visits and workshops as well as informal discussions as part of my professional role served as sources to draw upon to support category development and theoretical direction. They served to frame events and make analytical sense as well as allowing triangulation of findings. The memo extract below from my journal (fig.4.18) demonstrates how I sought to gain additional insight into the approaches adopted for training in the workplace through highlighting further the concept of separation. Addressing the reasons behind these separations and asking further 'why' questions about the portfolio assisted in the development of the theoretical categories as I expand upon in the next section.

Informal discussion with student:

I haven't started my portfolio yet. The training officers says we don't really have time yet – we are too busy doing the day-to-day work in the lab.

Informal discussion with training officer:

I don't really have time to do the portfolio training with them we are so busy and understaffed. It would mean having to take them away from the work they are doing in the lab and we don't have anyone to cover them.

There is a separation of learning to work in the laboratory from the portfolio. What do they see the role of the portfolio as? Why is it separated? Do they see the portfolio as supporting learning to work in the lab or as a formal assessment that demonstrates processes have been followed and standards met? An external assessment – recognised and unambiguous? If they are doing the work in the lab have they not met the standards articulated in the portfolio??

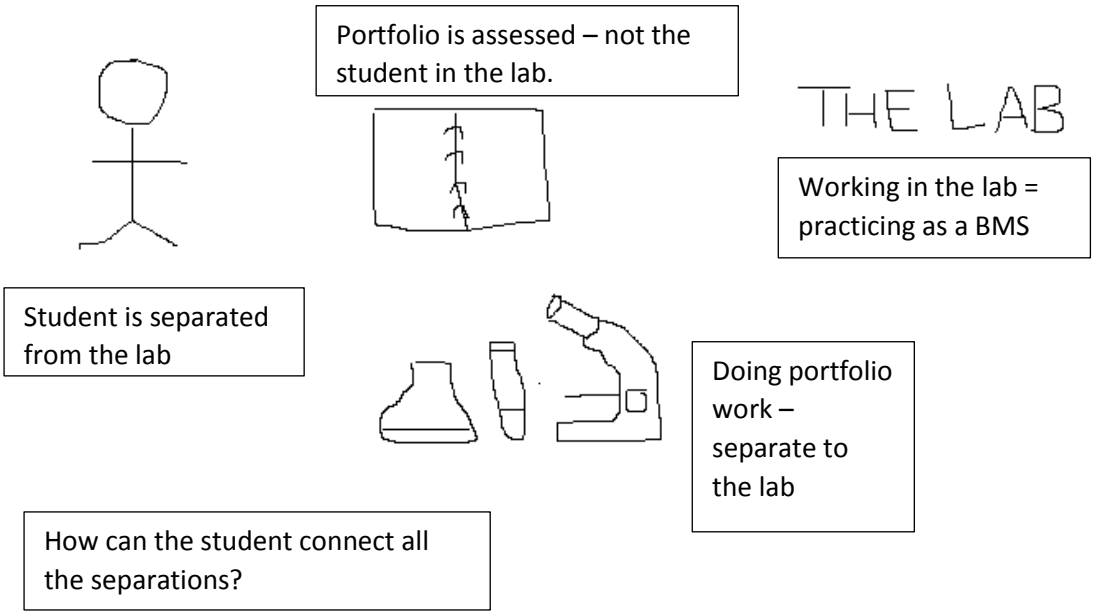


Figure 4.18 Memo extract

As I progressed with focused coding my research questions were kept in mind and I focused upon day-to-day practices and perceptions of these practices by those involved in the programme. As I have outlined, I used diagramming and flow charts to assist me to conceptualise the data gathered and to make sense of the codes. Constant comparative analysis was maintained until all theoretical categories were identified. This was achieved by evaluating the interaction of codes and categories

as well as the meanings assigned to these by each of the stakeholder groups. For example, ‘tick-sheet approach’ was also labelled as ‘competence based’ and ‘lack of ownership’.

4.4.3 Theoretical coding

Charmaz (2014, p150) describes theoretical coding as a sophisticated level of coding and one in which the researcher theorizes the data and focused codes. It therefore, provides a way of conceptualising how substantive codes are related and allows the analytic story to develop in a theoretical direction. This was a very intense stage of data analysis and one in which I found myself continually returning to both the transcripts and document analysis, revisiting coding and focused coding to draw out meaning from the data.

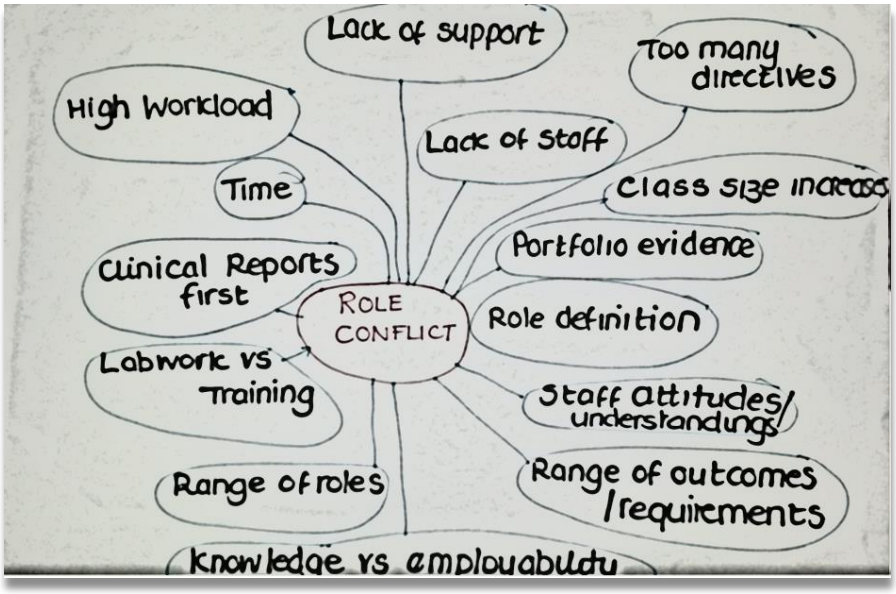
The use of diagramming and of clustering was fundamental in helping me to understand and organise the codes I developed (Rico, 2000, p.17) and to route my work in an analytical then theoretical direction. Initially I clustered similar codes, I then clustered around processes to allow me to look at actions. This process allowed the sifting and sorting of data gathered to identify three main theoretical categories: *Role Conflict, Expectations* and *Ownership*. I have used the theoretical category of Role Conflict as an example to illustrate how I undertook this analytical process of category development. Figure 4.19 provides a detailed representation of how I developed this category. Here I provide an insight into how I moved from initial codes (column one), focusing codes by clustering of similar codes to identify processes (Column two) and then resultant actions (column three) leading to *Role Conflict* as the identified theoretical category:

Figure 4.19 - Example of Code and Category development leading to theoretical category development – Role conflict

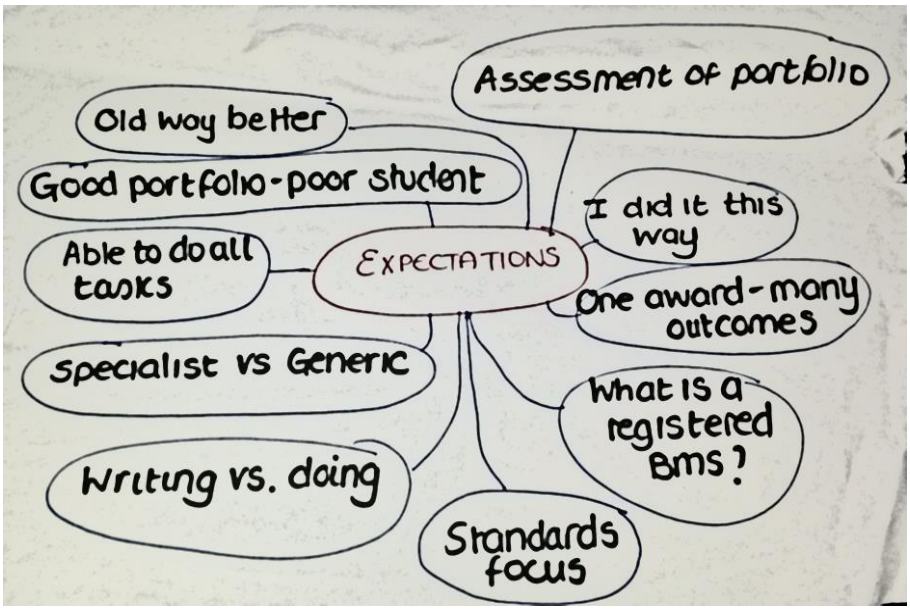
A range of different job roles, perceived priority of these roles and increased workloads were common reference points which the stakeholders drew upon when talking about their approaches and positioning in their role. The influence of the requirements of the healthcare environment as well as an academic environment was seen to have a major influence on the positioning of individuals. It became obvious that the positioning of students was influenced by the positioning of

practitioners in the laboratory environment with comments about ‘workload must come first’ and ‘training must wait till the lab work is done’ being common labels.

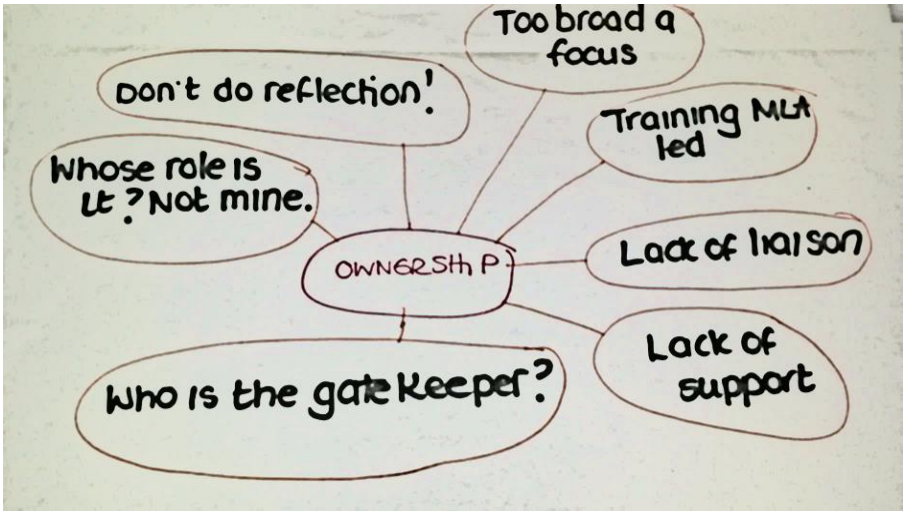
Below in figures 4.20 (a-c) are some examples from my journal of initial ‘jottings’ used to help me to interpret the codes and their relationships.



(a) Clustering to support identification of the theoretical category of role conflict



(b) Clustering to support identification of the theoretical category of expectations



(c) Clustering to support identification of the theoretical category of ownership

Figure 4.20 Example of clustering of focused coding to support identification of the theoretical categories of Role Conflict (a), Expectations (b) and Ownership (c)

As I developed the theoretical codes the meaning of how role conflict impacts upon the different stakeholder groups was developed through expanding upon these initial jottings in my memo writing. The development of standards and learning outcomes against which a student could be assessed were seen to be a major influence on each of the theoretical categories. These were seen as an additional burden to the current workload of each of the stakeholder groups, increasing workloads and decreasing the time to perform other roles. Standards were adopted as separate entities which not only created an additional workload but also impacted upon stakeholders' expectations of the role of work place learning within the current programme as well as the stakeholders' perception of ownership of outcomes.

Approaches adopted are greatly influenced by the clinical environment and how these impact upon the individual – role conflict. This in turn influence their choices and approaches – use of standard worksheets to assess knowledge of a students practice and 'tick-sheet' assessment if a student correctly performs a set task are adopted when time is limited and often done at the end of the day when the workload is complete. Students are not taking part in the routine workload as a result – due to a perceived lack of time and a need to perform the 'clinical role' rather than 'teacher role'. Easier to assess competence in set tasks rather than 'day-to-day' application to practice and capability.

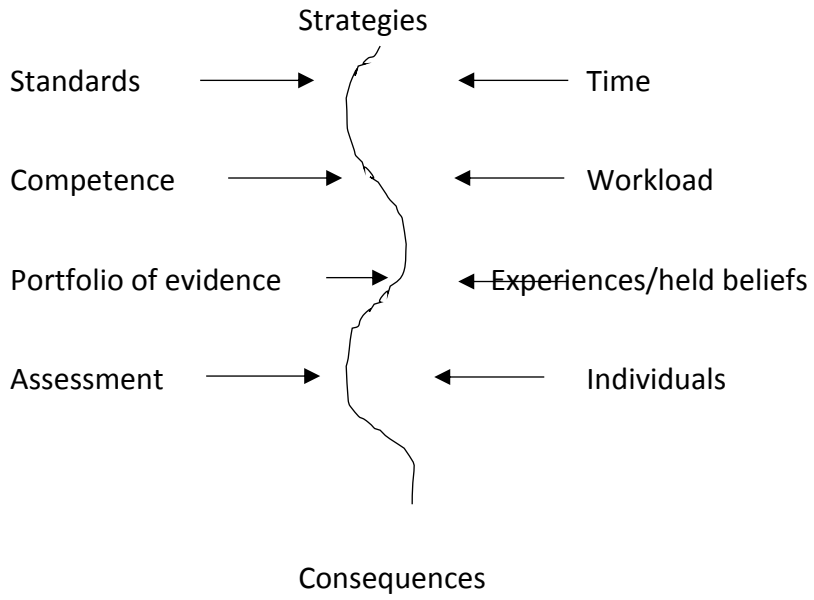


Figure 4.21 Memo extract

My memo above (fig.4.21) helped me to understand the range of influences upon the stakeholders. The interactions and intersections of the theoretical categories impact upon perceptions, actions and engagement of the stakeholder groups and the consequences that these have upon the development of capability.

4.5 Saturating Theoretical Categories

Charmaz (2014, p. 213) suggests that data gathering stops once the properties of the theoretical categories are 'saturated' with data; no new properties are found and

these properties account for the patterns in the data. Dey (2012, p.186) provides further clarification identifying that saturation implicitly emphasises a density of categories rather than choosing the simplest explanation that fits the evidence. By constructing categories through initial, focused and theoretical coding I identified recurrent conceptual patterns. Once comparative analysis and abductive reasoning stopped providing me with further insights into the theoretical categories theoretical sufficiency was considered to have been achieved.

4.6 Chapter Summary

In this chapter I have provided a description of how I analysed the data gathered from the methods discussed in Chapter Three. Two stages of data gathering and analysis were presented. The first stage allowed me to identify broad sensitising concepts and disciplinary perspectives to form developing categories through the review of professional documents/literature and the gathering of data from a questionnaire. The second stage drew upon the first stage for initial direction but also enabled me to gather further empirical data for analysis. My approach to data analysis drew upon the guidance of Charmaz (2014) developing initial, focused and theoretical codes to analyse data. I have discussed how constant comparative analysis and abductive reasoning enabled me to reason and make inferences about empirical findings. In continually returning to the data I was able to interpret findings differently in light of more recent data gathering and analysis, developing and consolidating my findings and establishing theoretical direction. Theoretical sufficiency was achieved through saturation of theoretical concepts. In Chapter Five and Six I discuss my findings and synthesise these into a theoretical account of the positioning of stakeholders in the BMS programme and the impact of this upon development of the capable BMS.

Chapter Five – Interpreting and theorising the data

5.1 Introduction

In this chapter I present the construction of the theoretical categories introduced in the previous chapter using the strategies and methods detailed. Three theoretical categories, *Role Conflict*, *Expectations* and *Ownership,* were constructed through this process and conceptualising the interactions and intersections of these enabled the theorising of the studied experience of the current programme from the perspectives of each participant representing the stakeholder groups (Charmaz, 2011, p.170). In presenting how I came to develop these categories I show what individuals do in practice, how they do it and then go a step further in Chapter Six to theorise why they act in these ways.

5.2 Construction of theoretical categories

The methods of data analysis adopted for CGT aim toward abstract understanding of practice rather than an explanation and prediction. We aim to 'unveil what *we* take for granted as well as what our participants take for granted' (Charmaz, 2017, p.6). Data gathering and analysis is an iterative process and as such it is very difficult to capture the constant comparative analysis that occurs throughout this process. In discussing my findings I present how I have drawn upon the voices of the participants and my reflective memos to support the development of theoretical sensitivity to demonstrate transparency and credibility for my theoretical direction.

5.3 Theoretical category – Role conflict

The theoretical category of *role conflict* recognises the challenges faced by each stakeholder group in performing their different roles, recognising the range of daily struggles reported by individuals in each of the stakeholder groups as they are required to adopt a variety of 'different hats' in their daily job role - these are summarised in figure 5.1. *Role conflict* presents itself in a range of guises and emerged from influences such as a lack of time to adopt the 'different hats', 'the hat' being inappropriate for the individual and issues of multiple roles.

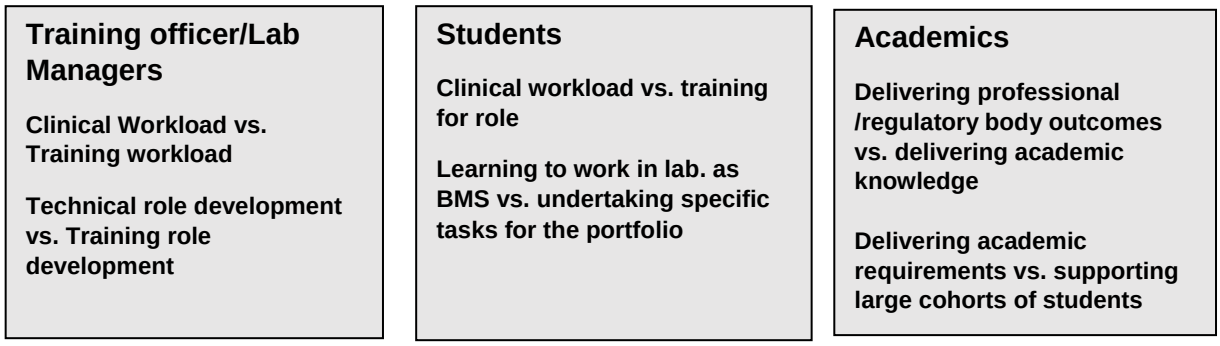


Figure 5.1 'Different hats' leading to role conflict in each stakeholder group

The primary function of the clinical laboratory, like any other workplace, is not learning but, in a clinical setting, the processing of samples and production of results. Pressures shaping the workplace are seen to be wide-ranging and in the case of the laboratories involved in this enquiry are directed by the current political and economic context as previously discussed in Chapter Two. In addition, professional and regulatory bodies provide guidance on learning, teaching and assessment for all those involved in the workplace and academic portion of the programme. I identified in section 2.2.1 how in constructivist grounded theory research the contribution of extant literature to theoretical development is acknowledged. The literature review and conceptual framework provided valuable sources of comparison and analysis and allowed me to identify how the ideas of others illuminate my own theoretical

categories (Charmaz, 2014, p. 305). Throughout this chapter I therefore, draw upon the literature and incorporate it into my interpretations to address the research questions.

Each of the competing 'hats' identified impact upon the positioning of individuals in their role and the specific approaches they adopt. Through continuous analysis and interpretation of the data I came to see that these approaches often hinder rather than support development of the capable practitioner. The next section details the development of this category.

5.3.1 Role conflict and the clinical workload

It became clear from the focus groups that an outcome of current service re-configuration, resulting from both local and national directives, is a 'reduced commitment' to training in the workplace. This manifests itself as '*service delivery must come first'*. This premise of '*workload comes first*' is reiterated by those delivering training in the three training officer/laboratory manager focus groups. As I proceeded with focused coding the significance of these pressures emerged. They require individuals to make choices about which 'part of their job role' dominates their time. Unsurprisingly the 'clinical hat' will always be worn in preference to all 'other hats'. It is my analysis of comments relating to this area that uncovers the significance of *role conflict* as a major category and a perceived barrier to delivery of the current programme. One laboratory manager joked that it would not really be acceptable to tell patients to wait for their results because staff were too busy training students:

> *No lab tests today – we are training!...The work that goes through the laboratory is always going to take priority over training. The patient samples have always got to come first regardless of the trainee (FG3LM1)*

This highlights the main priority that patient samples must be processed and reported in a timely manner. All other activities take ‘second place’. This issue of ‘workload first’ is not just articulated by laboratory managers and training officers, it is also identified in the focus group with the trainees. It demonstrates that placement students acknowledge this quite early in their placement year, highlighting the strong influence of the laboratory culture on perception of roles. The result of this is the ‘separation of roles’ as if the two are mutually exclusive. One trainee commented:

> *Workload always takes preference to the training – it has to be done, it has to be reported at a certain time….to spend time training someone and leaving that workload is just not going to happen (FG4 FT1)*

Trainees suggested that their own training must wait until the routine work is completed due to the time pressures and staffing levels in the clinical setting. The pressure of workload and reconfiguration of services has led to the situation where training of the workforce/future workforce is low priority for the laboratory and seen as an additional burden. This was clearly articulated by one of the training managers:

> *We are cutting back…even the training officers aren’t dedicated. So they are just doing it in their spare time as it were. The quality of training then isn’t as good (FG5LM).*

They demonstrated a concern for the lack of focus on supporting learning, seeing it as occurring in an *ad-hoc* manner with no structure or direction provided for students. This common view is not specific to a discipline or individual NHS Trust appearing instead to be a practice adopted by all participants in the enquiry. Since the roles of supporting learning and performing the routine workload are clearly seen as separated and mutually exclusive, this provides a challenge to supporting students in the laboratory. Training is being ‘fitted in’ rather than being supported as a routine part of daily practice in the same way as the clinical workload. As I interrogated the data further, unpacking the deeper layers below *role conflict*, a

range of consequences became evident that had a significant impact on the theoretical direction of my enquiry; guiding me to target more in-depth questioning around ‘who’ delivers and supports ‘what’ and ‘how’ in the programme?

5.3.2 Role conflict and training

One consequence of this positioning by the training officers of ‘workload comes first’ is that students see working in the laboratory as wearing a different ‘hat’ to the one worn for learning or training for the role of a BMS; separating their own learning from every-day practice. This was clearly defined when a student stated how they were too busy undertaking the routine workload to be trained:

> *….we are too busy in the laboratory doing the day-to-day work for me to start my training (Memo - tutorial discussion with part-time student)*

This suggests that working in the laboratory, undertaking routine techniques and ensuring timely reporting of samples is not seen as part of the pathway of learning to be a BMS by the students. The perception of two roles for the student and this separation of ‘working’ and ‘learning’ is shared by the training officers:

> *……We are so busy and understaffed. It would mean having to take them [trainees] away from the work they are doing in the lab. and we don’t have anyone to cover them (Memo -personal correspondence with training officer)*

The training officer was concerned that if they were to start ‘training’ the student they would not be able to carry on performing their work role in the laboratory. This suggests a very interesting dichotomy between ‘working in the laboratory’ and ‘doing the training’. It encapsulates how conceptualising learning through competencies rather than holistically separates it from authentic practice. Eraut and Hirsch (2007) identified that the most effective and valuable learning at work is that which occurs through the medium of work or through problems encountered during everyday tasks. The approach described by the student and training officer reflects the

restrictive workplace environment described by Fuller and Unwin (2013, p.52) rather than the expansive workplace where learning occurs as 'part of the work' embedded within routine procedures as social learning.

To understand why this separation exists and how this informs delivery of teaching and learning during the work placement year I asked analytical questions of the data gathered to illuminate current pedagogical approaches. This involved going back and looking at the initial line-by-line coding of the transcripts and revisiting highlighted sentences and the ones that voiced or reasoned my analytical interpretations. This in turn assisted me in developing a greater understanding and in creating theoretical direction, supported by memo writing (figs. 4.16 -4.21).

5.3.3 Pedagogical approaches to learning in the laboratory

I soon identified that a 'task-only' orientated approach to delivering training is the dominant approach adopted by laboratories for training – focusing upon demonstration of how to perform a process and assessing basic competence in a task. This was clearly voiced by a training officer during one of the focus group sessions when discussing the issue of relying upon support grades to help the students in the workplace:

> *When you are relying upon MLAs [medical laboratory assistants] for training it's just about showing the student how to carry out a task and they don't explain the underpinning knowledge to the student. They just show how to do it …and that is it. We do have to rely on some of the training being delivered like that. (FG3TO1)*

This approach was attributed to the use of support grades to deliver training due to *role conflict* experienced by the training officers. However, further questioning and analysis of conversations and individuals' comments led me to quite a significant finding. A procedural 'tick-box' approach to deliver and assess knowledge, where the

task is decontextualized from practice and wider impact of outcomes, is the model adopted for delivery throughout all levels of the profession irrespective of staff grade or time pressures. Training officers themselves admitted adopting a tick-box approach and to 'signing-off' of specific competencies:

> *[referring to their approach to training]…I think that it can be very much as a tick box exercise and a case of signing it off. It depends upon how you approach it and how much time you have. This is purely up to the individual discipline and the training officer. (FG1TO1)*

The potential impact of this approach being embedded into current practice was identified by the students during their focus group session. They acknowledged that their own approach to learning and what they learn is dependent upon who supports them in the workplace:

> *If it's a 'tick box' person [supporting training] then it is a problem [discussing one assessment] ...it was a paper exercise, all I had to do was write days, dates and legislation (FG3FT2)*

As can be seen, students will themselves adopt a simplistic approach to learning in response to a mechanistic approach. This is in sharp contrast to an approach that ensures deep learning where teaching involves supportive feedback, tutors trying to understand the issues students encounter and also providing clear explanations (Trigwell, Prosser and Waterhouse, 1999). Ramsden's (2003, p.43) work on approaches to learning identified the need for an environment, both social and physical, that promotes deep learning and encourages students to learn via active involvement to support adaptive capability. The outcome of the approach identified through my coding of the gathered data is that students do not ensure that they 'know' or develop the 'underpinning knowledge' around the process: they just learn how to 'mimic' what they are being shown and so adopt a behaviourist approach to mirror the training.

The wider impact upon current practice of adopting such an approach became obvious when one of the laboratory managers highlighted an issue they had recently identified:

> *I have concerns about training across the board. I have had some issues recently and it has highlighted the fact that we have been doing more of a 'tick-box' exercise for everybody – this needs changing. (FG3LM1)*

The laboratory manager underlined how training for all staff-grades appears to be following a tick-box approach and that tasks are undertaken in a very formulaic way for all levels of learning. This led to the identification of two important issues which I will expand upon below:

- Competency vs. capability approach
- Convergent vs. divergent approach

A task-only orientated approach to training can be seen to lead to a reductionist competence based approach rather than a more holistic capability approach which is more suited to the clinical laboratory environment and the role of the biomedical scientist. The focus is upon the individual learning how to perform a specific isolated task. This was consistently highlighted by each laboratory discipline represented in data collection and was not restricted to either the smaller or the larger Trusts. It is an important finding since the competency vs. capability debate was highlighted in my initial literature review as a dominant discourse in work based learning and learning for the professions. It is especially dominant in studies relating to medical practitioner training. Studies suggest that the need to move beyond a focus on competence to support the development of capability is essential to enable individuals to practise in the complex and ever changing workplace environment (Carryer *et al*, 2007; Phelps, Hase and Ellis, 2005).

The limitations of a competence orientated approach were discussed by one of the students on work placement:

> They watch you practise and they will say if it is good and how you can improve and once you reach certain standards they will leave you [to do it]…they don't really ask me questions (I7PP)

This identifies that competence in the laboratory is 'the ability to perform tasks' via a behaviourist approach to learning. In Chapter Two I discussed the extensive research into a 'task-orientated' approach to training practitioners and the issues around capability development. De-motivation of trainees and a limited focus upon professional development results from such an approach, with acquisition of minimum standards being the main goal for training (Leung, 2002). Bathmaker and Stoker (1999, p.55) refer to programmes adopting this approach with the derogatory label of '3R's'; Reductionist, Restrictive, and Ritualistic. As can be seen from the student's comments above, learning becomes ritualistic and based upon transmission pedagogies. Competence is perceived as 'behaving in a specific way' in a specific situation. Knowledge transfer is perceived as a decontextualised process in which the trainer and student perceive learning as stable individual mastery of well-defined tasks.

It would not be contested that knowledge is an essential ingredient of learning to practise but the simple mastering of individual skills and knowledge has been shown to be of limited influence in improving professional development (Eraut, 2000). A transmission based approach to learning ignores the community of practice in which the student is working with learning situated in individuals rather than as a social practice (Bleakley, 2006).

As highlighted in my literature review, theories of learning related to supporting practitioner development are constructivist and sociocultural theories (Evans *et al.,* 2006, p.11). Importantly they emphasise the significance of both the context of learning and the environment in which it occurs. Within this approach learning is not seen as individual acquisition of abstract concepts separate from interaction and experience (Engestrom, 1996) as demonstrated in the transcript excerpts above. Learning occurs through purposeful interaction in social settings (Evans *et al.,* 2006, p.11).

An approach that focuses upon capability rather than individual competences alone is more appropriate to support the development of practitioners (Lester and Costley, 2010). My findings suggest that the move from a behaviourist view of learning to a wider view of learning as social practice to support practitioner capability presents as problematic in the scientific context of the clinical laboratory. As a result, the approaches used do not reflect those identified as supporting practitioner development. The problem of not adopting an appropriate pedagogy was identified by a laboratory manager who highlighted the wider implication of implementing a transmission approach (FG3LM1). They described how when errors occur in the laboratory these are not being detected by the members of staff performing the technique; they just perform the task without thinking about 'what' or 'why'. The outcome of a procedural, decontextualized approach adopted in current practice is clearly identified. Staff of all grades do not have a full understanding of the techniques that they are performing and so are unable to respond to the demands of a 'rapidly changing and ambiguous environment' (Hase and Davis, 1999, p.298). This also has a major impact on the professional role of the BMS; individuals will only develop narrow practical and theoretical knowledge. This in turn limits their

development as independent and capable individuals able to engage in professional practice and support others. This was commented upon by a student:

> *We get trained by MLA [medical laboratory assistants] or other staff who don't even know what is the principle behind the test. They are just shown a SOP [standard operating procedure] and they know that they have to follow these steps and to look after these specific things so this is what they are going to pass on to you. This was my experience actually, especially since they don't have the broad knowledge (FG4FT3)*

The student's comments would suggest that there is a lack of 'underpinning knowledge', with those delivering the training not knowing the 'principles behind the tests'. A surface approach to learning is adopted due to the lack of supportive feedback and provision of explanations (Trigwell, Prosser and Waterhouse, 1999). The overarching impact of a surface approach is that individuals do not identify errors or mistakes during performance of their role in the laboratory. There is a lack of support to develop an awareness of what the results mean and why the tests are being performed; a deep approach to learning (Ramsden, 2003, p.43). The limitations of this become self-perpetuating; when these individuals support the learning of others they do not have the underpinning knowledge required and so individuals can only train via a very narrow competence based approach.

Another consequence of this narrow focus on task performance is a lack of support for the development of confidence and independent practice in the individual. These skills are identified as an essential component of capability. Stephenson (1998, p.4) suggests that a narrow focus results in students developing the required basic skills to perform individual tasks but that it may fall short of providing the student with the confidence to use them when circumstances are slightly different. In addition, a focus upon tasks does not tackle emotional development as well as other dimensions of

personal development (Bryans and Smith, 2000). Interestingly this was identified by one student who summed this problem up very well when talking about their training:

> *It is a blessing and a curse [approach to training] …. I can do the tasks but whether or not I could apply then to work in a range of situations is another thing…..I have competency assessments ..they assess my skills at using an analyser and even on the manual bench...I had all these individual assessments (I2PS).*

As a result of this focus upon task, the student was worried that although they knew how to do the individual techniques, when they were placed in a busy routine laboratory they would not know how to actually apply this knowledge and cope with unknown situations, hindering capability development. This evidences a convergent approach to learning concentrating upon identifying and evidencing whether extant objectives have been achieved. This contrasts with a divergent approach which is orientated towards what individuals can do in a range of settings in a more exploratory fashion (Torrance, 2007). My initial literature review assisted me to recognise the different pedagogical practices being adopted in the workplace which assisted me to construct a deeper understanding of practice and how it impacts upon learning. Initial and focused coding of focus group and interview transcripts identified an approach that reflects what is referred to by Fuller and Unwin (2013) as a restrictive workplace environment:

- *participation is limited to a narrow range of similar tasks, knowledge and locations*
- *Learners acquire hierarchical and unreflexive expertise*
- *Knowledge is transmitted to novices by 'experts' in the task (p.52)*

This clearly summarises the findings from the focus groups. The approach contrasts with what they refer to as an expansive environment where learning is 'part of the work': embedded within the routine procedures and viewed as social-learning. Participant comments highlighted a separation rather than an embedding of learning

within practice. Following this specific pathway enabled me to question participants in more depth about the delivery of training and support for learning. One training officer proudly discussed their 'training packages' for all activities and techniques used in their particular laboratory:

> *We have training packages that we use with all staff so that they are equally useful for training a band 8 [manager grade] as they are for MLAs or trainees. It's making sure that the training is all delivered in a comprehensive way no matter who trains…then they can be signed off when they do the competency assessments (I10TO)*

This excerpt from an interview with a training officer highlights the inherent nature of learning focusing upon a behavioural approach and ignoring the complex and adaptive environment of the clinical laboratory. It illustrates a dominant, performance-based discourse throughout all levels of training and embedded into pre-registration 'training programmes'. Further data gathering and analysis allowed me to identify that standardisation of training and assessment occurred across each of the disciplines but with a focus upon 'training packs' and 'assessment of competence emerging as a dominant discourse from the more automated, high-throughput laboratories of haematology and clinical biochemistry. The automated laboratories receive large numbers of samples daily and my findings suggest that training officers and students in these departments focus upon following protocols and demonstration of competence in set tasks. Drawing upon the literature I identified that this approach relates to the model of technical rationality which Schön characterised, focusing upon professional practice as instrumental problem solving (Schön, 2002, p.40). This 'package based' approach leads to the development of what is best defined as procedural knowledge; developing specific skills for specific jobs rather than a focus on the overall learning experience (Leung, 2002). The band 8 member of staff discussed in the excerpt above is equivalent to a medical

consultant grade. A much greater depth and breadth of knowledge would be expected from them than would be expected for a laboratory assistant. Yet, the comments from the training officer from one of the automated laboratories suggests that the programme of training at all levels in the laboratory setting is perceived as a specifiable series of behaviours that can be codified and individuals trained to perform them correctly (Hager, 2013, p.18). The important point is that adopting this approach enables 'training' and 'assessment' to be delivered and monitored in a 'tick-box' manner but it ignores what Dewey (1938) defines as 'actual experience'. He identified the essential link between understanding and the context in which it occurs. He emphasised the importance of not separating these events and the circumstances in which they occur. Context is not fixed or well-defined especially within a laboratory environment; the social world in which experiences occur shapes the activity. However, I identified separation throughout the programme with separation of roles, actions and contexts. The training officers have developed objective assessments to allow demonstration of achievement and accountability against standards. This suggests that development of the practitioner is perceived as gaining a set of skills and highlights the dichotomy between education and training and the adoption of inappropriate pedagogical approaches.

5.3.4 Role conflict and Training to Train

Going back to my transcripts and looking at some of the discussions around attitudes to training and methods used revealed that the adoption of inappropriate pedagogical approaches is not just due to pressures on role, but is also compounded by the lack of support or formal preparation provided for those delivering the programme. The role of the training officer straddles both settings where the

programme is delivered; clinical and academic. As I questioned further about roles and responsibilities the lack of support in delivering these roles emerged in the discussions. For those based in the workplace there is a focus upon support for developing within their clinical role rather than for their 'training' role. This lack of support for the laboratory based stakeholders was initially identified through responses in the questionnaire. Training courses and professional development for BMSs focus on them developing discipline specific skills and there is a lack of formal support to develop in the role of training officer or mentor:

> *It is very difficult for new training officers to take on the role and to assess a portfolio. There is no formal training….. Even the Training the Trainers course that the IBMS runs is supposed to be there for training officers but they don't do any assessment and they don't teach how to assess…….there is no practical aspect of anything like that. I am a C&G assessor and I have been watched and assessed in that role…I found that really useful (FG1TO3)*

In the excerpt above the training officer highlighted an issue raised by most of the training officers. They all identified a feeling of isolation within their role. There is a requirement for them to 'deliver training' but with limited support to perform this role. They are initially trained as BMSs and move into the role of trainer often by default. Most receive no formal training to undertake this role and so have no grounding in learning and teaching. The professional body deliver a basic course for trainers but there is a general feeling that this is not 'fit-for-purpose'. The course is perceived as very theoretical and not providing support for practical application, feedback and development*:*

> *[Talking about the IBMS Training the Trainers course]… it is more about different types of learning. How people learn from reading or others from practical activities and just about appreciating the types of training – more of a general thing (FG5TO2)*

The individual interviews assisted in my interpretation of this area in greater depth around the perception that there is little support or preparation for the role of the

trainer. Training officers highlighted how they were never assessed in their role as a trainer:

> *I have never been asked to evidence that I am competent to train other people. We have competencies for all other areas of lab work (ITO3).*

This suggests that individuals move into the post of training officer with limited preparation or support for this role, and then no one evaluates their practice or provides support or feedback to enable them to develop in this role. This absence of training feeds into the inappropriate pedagogical approaches adopted by those delivering training. As suggested by Tedseco-Schneck (2013, p.59), because of this lack of preparation for role, training focuses upon measurable competencies and behavioural outcomes driven by a subconscious alignment to the 'esteemed [positivist] paradigm of medicine'. The approach to sample processing is adopted for the training of individuals; broken down into objective steps.

Not only does the coding and interpretation of data from focus groups and interviews with training officers suggest that there is no dedicated time to allow training to be adequately delivered and resourced, it also identifies that the role of this group of staff is not adequately acknowledged. Training Officers felt quite strongly about the lack of recognition for their role:

> *HCPC [registration] is the most important part of the profession. The training officer has a very important role. (ITO2)*

They discussed how they are responsible for supporting the student to achieve registration into the profession which is a very important role – yet there is very little recognition for this role. In addition, they are always expected to put their clinical role first:

> *A major problem is when you have pressure in the lab there is lack of support for training officers to deliver training….there is no support for training yet we are training the new BMSs of the profession. (ITO1)*

My reflective memos recorded how training officers became quite animated and passionate about the need for change during discussions. Initial document review in stage one of data gathering identified that the professional body recognises the need to support the role of trainers in practice but does not offer higher qualifications or support for those involved in training. Career progression as a trainer has no defined or recognised pathway which is a challenge for the profession. Role recognition and support have been shown to be essential for supporting the delivery of any work-based teaching (Bridges *et al.*, 2011). The training of mentors and others involved in supporting students enables the building of confidence in interactions with students. BMSs need to have the support to develop their teaching and facilitating skills as well as their expertise in terms of current practice.

Problems arising from not ensuring that the correct support is provided for trainers is clearly seen through the inexperience identified in how they support learning activities and a fundamental misinterpretation seen of the nature of learning. The lack of dedicated support and recognition provides a challenge to the individuals performing these roles and for the profession in ensuring a culture of appropriate professional development is established. A lack of support and development of the underpinning knowledge to support and deliver learning and teaching results in a barrier to the development of practitioner capability through the adoption of inappropriate pedagogies.

5.3.5 Role conflict and the Academic

Role conflict was not just identified as an issue in the laboratory it was also identified in discussions with the academic stakeholders and this can be seen to affirm the focus upon tasks and individual agency highlighted above. To set this in context I will first start by discussing the students' perceptions of learning and teaching on the academic portion of their programme. Interestingly, the approach adopted for training in the workplace is not dissimilar to the students' accounts of their practical experiences in their university setting. The excerpt below is from a student who had recently started their work placement and reflecting upon the practical experience gained during their first two years at university:

> *…we need more time in the labs [university practical classes]. ..instead of three set hours and at the end you hand in your sheets… I think maybe half an hour explaining and going over it…there should be more time in labs to discuss what we have done and why (I5PP)*

This student discussed how their practical classes involved entering the laboratory, carrying out procedures and then having to write these up as reports. The student's experiences suggest that again a transmission based, narrow competence approach to learning is being adopted in the academic programme too. There is no support for conceptual understanding of the tasks. As previously outlined such a procedural approach can ignore the connections and underlying meanings of tasks and roles (Leung, 2002) and this was readily acknowledged by the student in the excerpt above. It does not allow individuals to be individuals; there is no place for alternative indicators of performance (Marshall, 1991). Coding of discussions with academics identified the concepts of class size, specifically large class sizes, and the need to cover a wide range of topics in each module. Focused coding, which allows comparative analysis and the eliciting of information on the social situation being

examined highlighted that tutors 'blame' these factors for the adoption of a transmission approach. Tutors highlighted how they have little time to provide individual support for students. One academic discussed the issues they struggled with:

> *I think people seem to forget how big the degree is [referring to the content to be delivered and cohort sizes]. …...are we just providing a knowledge base?…I think this is a danger since the class sizes are too big. This impacts upon our approach to teaching (I12)*

Delivery of a wide range of requirements to ever increasing class sizes was identified through focused coding as a perceived barrier to the adoption of an appropriate approach to support the student. Findings suggest that a consequence of trying to satisfy a range of directives is that none of these may be fully met and this results in adoption of approaches which do not satisfy any of the requirements; didactic lectures to large groups of students and laboratory practical classes focused upon completion of tasks. Wolf (1990, p41) identified a focus upon output measures in awards linked to occupational standards. Findings suggest that there is a focus upon measurable outcomes in the current award to demonstrate that set standards have been achieved by students. Degree courses linked to professional registration need to not only address the academic learning outcomes but also support the individual to apply knowledge and skills to allow capable practice in the workplace; achieving the standards for professional practice and 'develop sustainable abilities appropriate for continuously evolving organisations' (Fraser and Greenhalgh, 2001, p.799). Employers expect graduates who can quickly adapt to the workplace and apply themselves (Harvey *et al.*, 1997). Lester (1999, p.46) uses an excellent metaphor to define such practitioners, describing them as 'map-makers' rather than 'map-readers'; an individual who can adapt within the workplace and meet such challenging environments. The didactic and transmission pedagogies embraced by

academics support development of the ‘map-reader’. In contrast constructivist and sociocultural theories of learning emphasise the need for learning environments that encourage students to question and learn via active involvement to support capability development (Lizzio and Wilson, 2004) and so foster the ‘map-makers’.

Asking further questions of the data enabled me to establish relationships within the codes to assist in developing an interpretive frame which offers an abstract understanding of these relationships (Charmaz, 2014, p.248). Although time and class size were initially recognised as barriers to an appropriate pedagogic approach, further analysis identified that those supporting learning in the workplace have limited support and preparation to undertake this role – as recognised in the workplace. Most academics have entered their role via an academic and research based pathway. Most have very limited experience of the clinical laboratory:

> *How many of us are BMSs .. that is a problem. When I go into a lab I see a lot of equipment.. its just all instrumentation (FG2SL2)*

There was general agreement that due to a lack of experience or collaboration with the clinical laboratory academics automatically focus upon the knowledge base only or in the case of practical classes, the techniques, since they do not have the experience or professional knowledge in this area to support the student to be able to apply knowledge to practise: again resorting to a transmission led convergent approach. In addition, academics focus upon their own pathway and the approach taken to teaching them: *our perception of what is required… its different for all of us isn’t it? I want to make a researcher because that is what I am (FG2SL).*

A curriculum that focuses upon isolated and basic taxonomy of disciplines and acquisition of facts does not support capability development (Fraser and Greenhalgh, 2001). Evans, Guile and Harris (2013, p.157) identified the need for

individuals to become aware of the culture of the workplace and to develop a professional identity. Abductive reasoning of the data helped me to identify that a lack of experience and limited collaboration presents a major barrier to the development of such an approach for the participants in the enquiry.

There was a general agreement that one course could not address all of the requirements expected adequately and that trying to develop underpinning knowledge, professional development and proficiency in the workplace was a step too far as voiced by one academic who stated, '*We are actually asking for an awful lot from a degree (I12)'.* This suggests that as well as there being *role conflict* for the academics, there is also *role conflict* for the award or a lack of clarity around the perceived role of the award for the profession. Significant transformations occurred during the 1990s reflecting market-driven economic forces and as a response to globalisation (Olssen and Peters, 200). Political and economic forces became drivers for these transformations in the higher education sector reflecting a policy agenda in which education is performance driven and effectiveness is demonstrated by results. Findings suggest that the pressure upon both the award and those delivering the award to address perceived outcomes is potentially too big a task; can one award support the development of academic and professional based knowledge and practice?

In unpicking how roles and responsibilities impact upon delivery of teaching and assessment in the workplace I began to identify significant differences in individuals' *expectations* as I coded and categorised the gathered data. These also impact upon positioning and delivery of the programme. These findings directed my pathway of enquiry to analyse and evaluate the mismatch in expectations around both the programme and the roles of those supporting the programme to uncover the

underlying significance and the impact of stakeholder positioning and support for the development of capability. *Role conflict* results in the positioning of stakeholders to adopt a transmission based approach to supporting learning and teaching on the programme. As I will illustrate below, the intersection of the two other theoretical categories of *expectation* and *ownership* magnify the issues already identified above resulting in them being totally embedded in the current approach to programme delivery.

5.4 Theoretical category -Expectations

The term e*xpectations* is used to articulate the views held by participants as stakeholders, around their own expectations of the programme, their roles and the roles of others. This theoretical category embraces their perceptions as individuals of expected outcomes from the programme leading to approaches adopted to support teaching and learning. Interestingly, as I interrogated the data further, I started to question whether the participants actually viewed themselves as having a 'stake' in the teaching and learning on the programme. In following this pathway of questioning I found that e*xpectations* varied dependent upon which 'hat' was being worn by the participants; showing a close relationship with *role conflict*. In unpacking the range of expectations held further, I found inconsistencies in and between the participant groups. As previously presented, those working in the more automated disciplines focus upon tasks and skills. Participants in these disciplines, especially the laboratory managers had an *expectation* of newly qualified BMSs being able to 'hit the ground running' and seamlessly become a member of the team. Those in the manual disciplines were more open to having to support post-registration training for the newly registered BMS to enable them to perform in their new post. These differences in expectation of role in turn have an important impact upon delivery of

the current programme and the perception of the programme as ‘fit for purpose’. The concept of ‘fit for purpose’ was first identified in the document review stage. Findings from this stage of data gathering, discussed in Chapter Four, identified disconnect between the perceptions of the professional body and those of some participants completing the questionnaire. As I discuss below, I pursued this line of questioning further to construct a greater understanding around the concept of *expectations*.

Expectations first emerged from focusing coding around culture and tradition. I came to see that previous experiences and the individual’s own career pathway impact upon their *expectation* both of their own role and also the role of the award. My review of the development of the current programme (Chapter Two), highlighted how delivery and the requirements for entry onto the professional register have changed over the past two decades in response to both political and economic transformations. Analysis of transcript data suggested that training officers and most laboratory managers participating in the enquiry are expecting an ‘oven ready and self-basting’ practitioner (Aitkins, 1999); an individual who requires limited induction or support from the employer to enable them to perform their role. This expectation appears to be a result of both an ‘I did it that way so it should still be the same’ attitude coupled with a lack of time to support induction and training for new members of staff due to the increased burden of the clinical workload. The role of producing this ‘oven ready’ BMS appears to be perceived as firmly the remit of the academic institution. Hager and Hyland (2003) identified this expectation in their research into awards linked to vocations where often the academic studies are seen as being preparation for the workplace, supplying ‘knowledge that they will apply later on to solve problems in their workplace practice’ (p.274). This does not acknowledge that the workplace is a unique and important source of knowledge to

support practitioner development. Informal on-the-job training plays an important role in practitioner development both pre- and post-registration (Eraut and Hirsh, 2007). Interpretation of the coded data suggested that these *expectations* reinforced the view of the participants as not having a 'stake' in the current programme.

Further questioning of the data enabled identification of a disconnect between *expectation* and required outcome which allowed a greater understanding of the participants' positioning. When participants were asked about their *expectation* for the work placement year they all suggested that it was for the student to complete the portfolio and allow registration. Unsurprisingly, their expectation of their role in supporting the portfolio was delivery of a 'practical', 'hands-on' learning experience where performance in set tasks equates to achievement of competence to fulfil the standards of proficiency. This is seen in the following excerpts from a training manager and a training officer when asked about the role of the placement year:

> *Practical competence in the discipline: it is a hands-on job not producing reports and doing exams (FG1TM2)*
>
> *I think that if they [the trainee] can do that task and we have the evidence to enable a box to be ticked then that is fine – done (FG5TO1)*

This perception of the placement year was evident in discussions with participants from the large city centre laboratories as well as the smaller rural hospitals. The focus was on ensuring that the student completes set tasks to demonstrate that they have met set competencies. Unsurprisingly, this opinion reflects the approaches currently adopted to support teaching and learning in the laboratory environment as discussed in 5.3.2 (Role conflict and training). Competence in tasks is conceptualised within a very narrow framework by those involved in supporting students in the workplace which appears to be directed by the Standards of Performance within the Registration Portfolio. This is probably a reflection of the

limited appreciation by training officers of theories of learning and the lack of support provided for them to ensure that they are able to perform their role.

However, when laboratory managers and training officers were asked about their *expectations* of a newly registered BMS a considerable gap was seen to exist between what is 'wanted' and what is 'delivered' by their adopted approach to training:

> *[talking about performing in the laboratory]… understanding and having the sense behind why they are doing it is also needed – they need to ensure that they obtain the expected results (FG1TO3)*

The training officer quoted above is clearly expecting an individual who can perform a range of techniques, understand the importance behind the techniques and the outcomes and use professional judgement if something is not as expected. Thus, not just the 'know-how' but the 'seamless know how' or 'practical wisdom' as defined by Hager (Hager and Hyland, 2003). This 'practical wisdom' does not just apply to technical procedures but also to what one training officer referred to as 'general stuff':

> *I would add autonomy, working unsupervised. Having the knowledge to apply to situations and this goes across the board. Not just in a specific discipline but general stuff, like answering a telephone (FG1TO1)*

This suggests that there is disconnect between what is an *expected* outcome of the workplace year which is perceived as to gain successful verification for registration and the *expected* outcome of a 'fully qualified and capable BMS. This was reinforced further by a laboratory manager:

> *We need BMSs that can juggle several balls all at one time. Pick-up when things are wrong not just do one task at a time and not bother about what is going on elsewhere (FG3LM1)*

There is an *expectation* that the BMS can multitask and have a holistic awareness of practice within the laboratory and the wider environment. These comments clearly identify a 'gap' between the perceived roles of the workplace during the placement year and the *expectation* of the programme by individuals in the workplace. The expectation of the placement year appears to equate to teaching specific skills which allows the student to develop set competencies. Whereas, the *expectations* for the final outcome of the programme is to develop a capable practitioner who is able to function with minimal supervision in the laboratory setting. This leads to questions around 'when', 'how' and by 'which stakeholders' is capability development supported? The placement year and completion of the registration portfolio appears to be separated from learning to be a BMS, and developing the capable practitioner is separated from the role of the laboratory.

Fernandez *et al*. (2012) highlight that how training is perceived, implicitly or explicitly, by those involved in workplace training impacts on how learning and teaching is structured, delivered and assessed. To understand further why the separations identified have evolved and the impact of how training is currently perceived, I next addressed how the standards of proficiency which inform the required outcome of pre-registration training have been interpreted and packaged into the registration training portfolio.

5.4.1 Expectations and the work placement year

Unsurprisingly participants' discussions suggested that the placement year is separated into 'portfolio training' and 'training in the workplace' just as 'training tasks' are separated from 'working tasks'. The result of this separation is a focus upon 'completion of the portfolio' as being the *expected* outcome of the placement year

rather than the outcome being the student developing the skills required to practise. Interestingly the role of the placement year was articulated as being to complete the portfolio by both the academic and work based participants:

> *I see the degree as giving the student the basic knowledge required in order to become a BMS. They need two things in order to practise – they need the degree and the portfolio. We supply them with the knowledge and the placement with the portfolio (I11)*

The excerpt is from an interview with an academic involved in supporting placements. It clearly suggests a view that the two are separate entities and delivered separately. This places an emphasis by the academics upon the workplace experience being for completion of the portfolio rather than for learning in the workplace and developing as a BMS. This focus impacts then upon the students' own perception of the placement year as I identified when I questioned pre-placement students (one month prior to commencing their placement year):

> *The workshops before placement were good for helping you to start filling out parts of the portfolio – it helps since you don't have so much then to do when you are in placement (I7PP)*
>
> *I enjoyed some of the sessions on how to build your portfolio, what to write etc. but I would have liked more preparation for the actual laboratory work such as some skills sessions – how to do dilutions or other sorts of skills that I needed to use in the workplace (I8PP)*

The workshops attended by students prior to their placement focus on how to 'build their portfolio' and how to 'write good evidence' rather than support for the work they will be actually undertaking. This reflects the findings from the initial data gathering which found articles in *The BMS* report on how to gather 'good evidence' and how to assess evidence for the portfolio. Returning to and reflecting on my initial data gathering, reviewing them through a different lens helped me to identify the absence of the student in the documents I had coded. Within these the focus is upon the portfolio separated from the student. This directed me to look at constructing a

greater understanding around the portfolio. Upon further questioning of the data I started to identify the portfolio as a 'disembodied entity' through the descriptions offered by the participants. From one student's description of the portfolio I even felt that it had the status of 'bogeyman' for many students commencing their placement year:

> *I looked at it [Registration Training Portfolio] and I was 'Oh God' – but I did try to plough through it (I4PS)*

Findings suggest that instead of the portfolio having a role in the workplace to support learning and assessment of progression it now dominates the learning experience resulting in the displacement of learning by procedural compliance. Those experiences outside of the requirements of the portfolio are potentially ignored. The continuous focus identified during both the focus groups and interview upon the portfolio as the role of the work placement year results in students not appreciating the benefits of being in the workplace or benefitting from a participatory approach to learning. What else the learner can do appears to be of little importance for achievement of the award even though it may be of considerable importance to the individual's continuous professional development and induction into the biomedical science 'communities of practice' (Wenger, 1998, p.7). This was reinforced by the following excerpt from an interview with a placement student:

> *[talking about the portfolio] One student was given time every morning or one afternoon a week. One student was doing it 24/7 for the last four months. I am just there in the lab just thinking they are obviously making progress and I am not. ……I was making slow progress since they [the laboratory] were focusing on my training …..and they put me on a section by myself since the manager thought I was capable…but like where is the time to do my portfolio work?(I3PS)*

This student appeared oblivious to the fact that they were gaining essential skills in the workplace and that these were being acknowledged by the manager. Social

theories of learning define learning as active social participation in the practices of a community (Lave and Wenger, 1991). It is the active interaction between the student and other individuals plus the environment that supports the construction of meaning and identify. It cannot be assumed that simple participation will result in learning. For the student, the training they were undertaking in doing this role did not equate to completion of the portfolio and so was perceived as having limited value for completing their award. Students are not drawing upon these experiences to develop their capability. Lave provides a culture-centred analysis suggesting that 'priority, perspective and value are continuously and inescapably generated in activity' (1988, p.181). Learning as an 'active person' through social engagement results in a different outcome to learning as an 'individual person'. It supports construction of knowledge and understanding by drawing on others and through interactions with the environment. Context and social interaction are critical components of BMS learning. The laboratory is a busy and continuously advancing environment where team work is essential. It has been shown that students need to know why they need to learn something and are seen to learn best when the topic they are learning is of immediate value and relevance to practice (Fraser and Greenhalgh, 2001). The dominant approach identified of learning techniques and procedures in isolation does not support this and so hinders capability development.

Coding and focused coding identified a continuous emphasis upon the portfolio as the learning experience which in turn results in students focusing upon just the 'portfolio'. Charmaz (2014, p.245) suggests that adopting gerunds 'fosters theoretical sensitivity'. I identified 'doing *the portfolio*' as a powerful concept. When I asked what is meant by the term '*doing the portfolio'* used constantly by one student during the interview the student responded:

> *Writing bits of evidence – and sitting at a computer and thinking what have I got to do for this bit and what have I got to do for that bit…I should have spent more time actually having to do the work [training at the bench] rather than sitting doing my portfolio (I3PS).*

The student was concerned with completing assessed pieces of 'portfolio work' to allow them to be 'signed-off' as achieving a standard; being assessed on their ability to answer questions or write about a test. This reflects the dominant approach outlined above that is adopted in the workplace to support learning. Most of the students and training officers demonstrated a focus upon 'sign-off' of competencies. The approach reflects the 'convergent' focus of learning. Students end up focusing upon 'finishing' the portfolio and having all sections 'signed-off' rather than learning about their placement environment and the range of daily interactions encountered by a practising BMS. These perceptions and approaches provide a challenge to capability development since the focus is upon *'doing the portfolio'* (a term adopted by students and training officers participating in the enquiry) rather than developing as an individual capable of performing the role of a BMS; '*gaining BMS currency'*. The term '*gaining BMS currency'* came from one of the interviews with an academic (I12Ac). On reading back through the transcripts I felt that this expression clearly articulated the aim of the current programme. It not only embraces skills and knowledge required to work in a laboratory setting but encompasses the additional skills that are highly valued by employers; demonstrating that they can '*juggle several balls at one time'* (FG3LM1), answer the telephone (FG1TO1) and possess the confidence to apply their knowledge in new situations (FG1TO2). The portfolio should support the student on their journey to '*gaining BMS currency'*. '*Doing the portfolio*' and '*Gaining BMS currency*' should not be mutually exclusive acts. Positioning by each of the participants involved in this enquiry appears to have directed this separation.

Interestingly, the gathering of evidence for the portfolio is perceived as demonstrating proficiency in the laboratory rather than actual performance in the community of practice:

> *.. I did try to plough through it as quickly as I could ….mine was virtually done by January because I had got the knowledge and I was just then increasing on that as I learnt…I was doing my work and I would get it all together and once it was complete I would ask them to sign my work and obviously the IBMS portfolio……I suppose I should have spent more time actually having to do the work [in the lab]– rather than sitting doing my portfolio (I4PS)*

The 'work' discussed relates to written work where the student was set questions to answer relating to theory of laboratory practice. This approach to learning suggests that there is no synergy between competency and education; acquiring the knowledge and learning the tasks performed by a BMS and learning '*to be a BMS'* (Cleland *et al*, 2014). Such comments by participants helped me to identify that '*Gaining BMS currency'* or 'learning to be a BMS' has become separate from '*doing the portfolio'*. In addition, the use of 'ploughing through' and 'quickly as possible' suggest a surface approach to learning is being adopted by the student rather than the required deep approach (Ramsden, 2003).

This worrying dichotomy directed me to undertake further analysis to determine what is actually being assessed as an outcome of the work placement year- the portfolio or the student's performance in the workplace. There was consensus that it is the portfolio:

> *Me: How do you assess that a trainee is meeting the required standards of proficiency before you 'sign-off' a specific area?*
>
> *Through their evidence, whether they have answered some questions that they have been set, either the ones provided in the portfolio [IBMS examples] or if they have been set an independent piece of work. (I10TO)*

Assessment is not taking place 'at the bench'; training officers are not mapping the student's performance in their day to day role to the standards of proficiency and

ensuring that the student is '*gaining BMS currency*'. Instead, pieces of work, either practical or written, are being 'set' to target a specific standard. Assessment of written work is constantly being relied upon and unfortunately this approach is endorsed by academics supporting the work-based placement:

> *Me: So what is being assessed – is it the student or is it the portfolio?*
>
> *I think it is the portfolio – it's the evidence in the portfolio….. the training officer has marked those pieces of evidence to show that the student is competent (I11Ac)*

This suggests that a student can produce a portfolio which will lead to all the standards of proficiency being 'signed –off' but is not capable of working independently in the laboratory. I posed this question to one of the training officers asking if a student can 'pass the portfolio' but not actually be capable in the laboratory:

> *You can and I have experienced it. The portfolio was 'passable' but the student couldn't adapt in the lab – could only cope with routine situations (I9TO)*

The shortcomings of the current approach to workplace learning which focuses upon set tasks and '*doing the portfolio'* was clearly articulated during one of the focus group sessions:

> *It is a very different thing to collect evidence for a portfolio as it is to actually have the skills and the inherent ability to become a BMS. We have a member of staff who we are helping with a portfolio and I would suggest that they would not be a very good BMS. But in terms of gathering evidence – fantastic. So there is a dichotomy there in terms of the portfolio - since strictly speaking that is what you are signing off (FG3 LM2)*

This is a very significant point demonstrating an acknowledgment that the current approach to workplace learning is focusing upon completion and assessment of set pieces of work that are in isolation or separated from the everyday workplace. This approach was confirmed on an observation visit where the training officer suggested

that the student could continue with their portfolio when they returned to university and send in ‘the work’ for marking. This would allow them to complete it during their final year back at university because they had not made the required progress during their placement year. Such an approach completely negates the need to be within the workplace and suggests that achieving the standards required for practice does not require practice in the clinical laboratory. The identified disconnect between current outcome of the programme and the *expected* outcome results from this approach and a lack of acknowledgement of a role as a stakeholder by participants.

It appears that all participants are struggling with their role as a stakeholder and to adjust to an appropriate pedagogical approach that allows explicit identification of skills and competence to satisfy professional registration whilst still supporting development for professional practice: acknowledging the workplace as a series of ‘interconnected activity systems’ (Engestrom, 2011, p.78) made up of a range of ‘communities of practice’ (Lave and Wenger, 1991).

Pitts, Coles and Thomas (2001) suggest that for a portfolio approach to support development of capable practitioners, learning should occur through students having experiences, reflecting upon the experiences and identifying the competencies achieved within this process. In addition, it assists them to develop a greater awareness of the social activity systems of each setting. My literature review identified a range of roles for portfolios within the professions linked to medicine (Davis, *et al*., 2001; Pearson and Heywood, 2004; McMullan, 2006). Of relevance to my enquiry, Greenhalgh and Hurwitz (1999) suggest that awards where the role of the portfolio is to demonstrate a learning journey and showcase the individual’s development in the workplace setting, the portfolio should contain ‘narrative accounts’ of the learning process with reflective discussions being held between

assessor (training officer) and those being assessed (student) to ensure that they support learning and a greater understanding of role by the student. This led me to question in more depth around the role of the portfolio during the placement year. Is it the way that the portfolio is implemented in the BMS programme that is preventing the development of capability or is it the design of the portfolio, addressing the standards of proficiency?

5.4.2 Expectations and the reflective portfolio

Schön stressed the notion of reflection as central to the development of professional practice (Schön, 1983, p.40). In the initial focus group it became obvious that reflection and reflective practice were taboo subjects for current practitioners. Further questioning found that the role of critical reflection on practice and the development of reflective practitioners is not being addressed in the work based programme. One of the main aims of critical reflection is in supporting the student in making the shift from an absolutist conception of knowledge towards contextual knowing (Moon, 2008, p.130) which is essential for the workplace. Previous studies into the implementation of a portfolio approach to support learning in the professions has highlighted how it can often result in individuals doing what they perceive as expected of them, with poor reflection, especially when assessment is involved (Austin and Braidman, 2008). I had already identified in a previous study a lack of support for reflective practice provided for students (Smith and Martin, 2014). This goes hand-in-hand with the narrow competence based and convergent approach adopted for teaching and assessment. Development of reflective practitioners is essential to support capability development and portfolio led learning since the reflective learner is receptive to feedback and able to adapt effectively in a changing

environment; especially within the work-based setting (Fraser and Greenhalgh, 2001). However, I identified that the approach currently being adopted for training does not encourage a reflective methodology.

When I discussed this concept with training officers they acknowledged that examples of reflective writing in the students' portfolios are descriptive in nature, providing an account of a process. They do not challenge this approach or attempt to move the students on to take a more critical stance: this reinforces my findings that the participants in the enquiry do not identify with their role of stakeholder. The following from a training officer interview confirms this issue:

> *Students reflective statements are not reflective – I find that they are more descriptions of what they did in the lab- no critical analysis of how, why and what etc….(I9TO)*

The training officer did not acknowledge that they should encourage and support the student to develop a reflective stance. When I addressed reflection with students their comments suggest that reflective practice for them is the process of completing a reflective report in the form of 'recipe following'. Analysis of the data suggests that this is due to lack of confidence or appreciation of the process:

> *Reflection was quite hard for me. It's when you switch from scientific third person to 'What I did, why I did this and thinking about the patient, which I wouldn't do since lab medicine is distant from the patient (I2PS)*

The placement student quoted above demonstrated a reticence to use a reflective approach in their writing due to a lack of clear guidance and understanding. Their comments suggest that they have adopted ritualised reflective practice during the placement as defined by Boud and Walker (1998, p.193). This assumes that learning outcomes can be expected of all reflective activities. However, reflection without direction can become disparate and diffuse, not allowing conclusions or outcomes to emerge. In contrast, too much guidance can lead to recipe following where elements

of models of reflection are turned themselves into a tick-box exercise which students work through in a mechanical fashion. Boud and Walker (1998) suggest that in such a situation, the learning outcomes of reflective practice are expected to be those of the statements of proficiency/competence. My findings suggest that this is occurring on the current programme. Just as training is very task orientated, students' reflections focus upon specific tasks and achieving these tasks. The adoption of such an approach was identified in conversations with students as illustrated below:

> *So for example for standard 2a I look at my coursework and state this is what I understood and given an opportunity again to prove myself against that standard, this is what I would do and any additional comments, what I could do differently…it's a reflection on what you understand (I5PP)*

The student identified the required learning outcomes for the standard (2a) and then demonstrated through critiquing their own practice how they achieved the standard rather than reflecting upon their practice in the laboratory and identifying what they had learnt. This highlights the problem that not all reflective practice, therefore, leads to learning (Boud and Walker, 1998). Reflective activities can become an obstacle when used inappropriately. Unless reflective practice is encouraged and supported in an environment which encourages students to make their own meanings and direct their own learning it can result in a process of 'satisfying the teacher' putting the emphasis on product rather than the process of learning. One of the students highlighted this issue of inadequate, inappropriate and badly used reflective activities leading to their perception of reflection as an obstacle:

> *They expect you to reflect at every stage of what you have done and I think that you could just reflect a whole passage about it – it's not needed all that much (I4PS)*

The student identified how the inappropriate use of reflective practice had led them to not value reflection as a process and not seeing how it could support their own

development. This lack of appreciation for the role of reflective practice in supporting practitioner development was confirmed in the interview with a training officer:

> *..I don't know what they are supposed to do for reflective practice – so if I don't know what they are supposed to write how can I impart that to the students? (I1TO)*

This quite clearly highlights how the value of reflection is not appreciated by current BMSs for their own professional development, but also that the training officer had the expectation that it wasn't their role to support reflection since they didn't know what it was. A range of emotions surfaced when I brought reflective practice into the discussions:

> *We are quite poor at reflection anyway aren't we…[talking about working in the lab] its 'black and white' and not 'touchy feely'(FG3LM1)*

These comments reveal the general perceptions around reflection and reflective practice. Focused and theoretical coding of data from these discussions allowed me to link to the paradigm bridge that I had initially conceptualised from coding around delivery of competencies and measurable outcomes. I found that most training officers and laboratory mangers could not define reflection, seeing it as a '*touchy feely'* process or avoiding a definition by saying '*I know it is something I should do but I don't have time'* (I10TO). This suggests a view of knowledge acquired from reflection, the 'touchy feely' knowledge, as falling outside of the scientific paradigm of 'facts' and so having limited value to the individual compared to 'true facts' obtained through scientific investigation. Students are just as vague with their definitions of reflection. Most suggest it is about thinking about an experience that went well or one that was not so good, while others identified it as thinking about and identifying what they had learnt:

You engage in practice and what you learn or understand is reflective practice…it's a reflection on what you understand. (I5PP)

The student's definition above is typical of responses from the students and further questioning identified that there is limited questioning of experiences by students; interpretation of their responses suggested that students perceive a looking back on an experience enables them to identify what they know or what they have learnt – again positioning their perception of the role of reflection within the scientific paradigm where 'real facts' are essential for learning. Reflection is also perceived as an individual activity, not something that they do as a group or with their training officer. One training officer stated '*I do a lot of reflection in my head but not too good at putting it on paper*' (I10TO). This clearly highlights a lack of appreciation of the role of reflection in supporting their own development and practice as well as in supporting their trainees. Raelin (2007) emphasises the importance of shared problem solving within the workplace, with an active participatory role in practice being crucial for the development the capable practitioner. Involving the student in 'learning conversations' supports the development of a reflective approach to learning (Evans, Guile and Harris, 2013, p.157). Findings highlight a distancing from such an approach due to a lack of appreciation and uncertainty around reflective practice and the value of the knowledge produced from it.

The lack of confidence around both a definition of and the role of reflective practice in the workplace setting to support practitioner development presents a major challenge to the programme. *Role conflict* was again identified as influencing an approach to training which ignores the need for the trainee to make sense of their experiences through a process of reflection. Participant comments suggests that reflection is a separate activity not part of professional practice. As I interpreted the conversations around reflection I came to feel that it too was a competence to be

ticked-off in the portfolio highlighting another 'separation' within the programme. Reflection is perceived as an activity which the student undertakes for assessment rather than a way of being and integrated into everyday practice. Since reflection is perceived as yet another required activity it is not surprising that time and conflicts were consistently raised as the main barriers in the workplace for supporting reflective practice. When asked why reflective practice is not encouraged a common response was:

> *I think it comes down to the fact that we don't have the time to spend on these trainees (FG3TO1)*

Again, time and conflicts were consistently raised as the main barriers in the workplace. However, I identified that the issue goes much deeper than time to perform a role. Conceptualisation of the data gathered suggests that the problem of reflection and reflective practice exaggerates the focus upon '*doing the portfolio*'. The workplace experience is seen to focus upon completion of the portfolio as the main outcome; as outlined, students are assessed upon the production of the portfolio rather than their development as a practitioner. When training officers assess the student's portfolio they are assessing the student's understanding on the basis of what they have written. Understanding of subject matter is a non-reflective requirement and this undermines the goal of encouraging reflection since the students will write about what they know and not reveal issues or what they do not understand. In a scientific field, emotions and feelings are usually not recognised and as a result it is common for reflection to be treated as an intellectual exercise; thinking rigorously (Boud and Walker, 2002 p95). As already outlined students identify their struggle with trying to adjust to a reflective style of writing '*Reflection was quite hard for me' (I5-PS).* There is no support to move away from the scientific

paradigm for these students and so they adopt an approach which they are more familiar with.

I found that this tension that students feel between the scientific paradigm and a reflective approach develops due to a lack of support pre-placement in the academic setting as well as during the students' time in placement. When I asked the students about their preparation for going into the workplace they identified a focus upon the portfolio and gathering of evidence rather than preparation for moving from university into the work environment:

> *It's fine to prepare us like with placement workshops and the HCPC stuff and prepare for the portfolio – that is fine. But I think there is a lack of focus on you as a person and what you are going to go into…..it can be really isolating (I3PS)*

This suggests that there is a lack of emotional support with preparation focusing upon tasks rather than moving into a new environment and 'community of practice'. One of the problems with intellectualising reflection and turning it into a process is that it can leave students in 'emotional disarray' (Boud and Walker, 1998, p.194). The student in the excerpt above identified how the focus upon procedures and '*doing the portfolio'* omitted important areas for support pre-placement. Reflexivity is about finding strategies to question situations and attitudes and to develop a greater understanding of the individuals' complex roles in relation to others (Bolton, 2010 p13). The students are not being supported to learn how to navigate the learning opportunities in the workplace or how to relate formal and informal learning in this environment. My initial literature review highlighted that 'horizontal' development should be an essential component of workplace learning. The transmission approach adopted in the current programme focuses upon vertical development, development of specific knowledge and skills. Horizontal development in contrast addresses

learning ‘across boundaries’ and developing the skills to negotiate the demands of working and learning in complex environments as a member of a team (Guile and Griffiths, 2001). This approach adopts a socio-cultural approach, where the student is encouraged to make links between work experience, the underpinning knowledge and skills and the context in which it is performed (Engestrom *et al.,* 1996). This is in sharp contrast to the simple transmission approach currently adopted.

The issues of separation again emerge in the data. The identified lack of understanding of what reflection means, what constitutes reflective practice and how it supports practitioner development is compounded by the assessment of the portfolio rather than the student – separating the two. Just as the workplace experience focuses upon teaching to task and the achievement of specific competences to complete the portfolio resulting in it becoming separated from learning in the workplace, the process of reflection has also become separated from practice. Ixer (1999) described reflection as a social construct, seeing reflection as influenced by the social, historical and political situation of the individual. By positioning reflection into the context of ‘self-reflection on tasks’ this ignores all other influences on learning in the workplace.

As a result students focus upon acquiring the skills identified in their training programme; ‘*doing the portfolio’* which is a narrow, unreflective and non-reflexive approach with set tasks developed to allow ‘signing-off’ of competence. There is strong agreement in the literature that an approach that focuses upon capability rather than competence alone is more appropriate to support the development of practitioners (Garner *et al.,* 2008; Lester and Costley, 2010). The competence focused approach that has been readily adopted within the BMS community for all levels of training can be seen to challenge the ‘*gaining BMS currency’,* essential for

supporting the development of practitioner capability. Lester (1999, p.46) argues that practitioners need to move 'beyond map-reading and become active experimenters and constructors of their own practice and the theory on which it is based'. '*Doing the portfolio*' does not support the development of 'map makers'.

As I questioned further the impact of this approach, o*wnership* emerged as a theoretical category that magnifies the problems identified. It appears to emerge from both *role conflict* and *expectations* of role.

5.5 Theoretical Category - Ownership

In trying to 'unpick' the layers influencing the current position I found that *ownership* or rather lack of *ownership* by participants emerged from the focused coding as a theoretical category, and as a consequence of *expectations* and role *conflict.* In this context I use the term *ownership* to define who has 'custody' of the outcomes of the programme and so entry onto the professional register. This requires a commitment to, responsibility for and recognition of the expected outcomes of the programme. I initially defined stakeholder as 'any group or individual who can affect or is affected by the achievement of the organisations objectives' (Freeman, 1984, p.46) and identified four stakeholder groups represented in my enquiry in the initial conceptual framework. As I have already discussed, findings suggest that participants do not appear to see themselves as stakeholders in the programme. My initial literature review emphasised the need for a common definition and identity between stakeholders delivering programmes linked to the professions. It was acknowledged as an essential feature for a successful outcome (Fullerton, Thompson and Johnson, 2013). Studies have highlighted difficulties in a range of professions where tensions exist around the role of the university and practitioners/mentors as the 'professional

gate-keeper' (Furness and Gilligan, 2004; Lafrance, Gray and Herbert, 2004; Pellat, 2006). In directing my questioning around this topic in focus group discussions I was able to identify confusion around *ownership* of the programme in terms of roles and responsibilities and who was ultimately responsible as 'gatekeeper to the profession'. This directed me to question around this topic in more depth in the interviews. Findings identified that the issue appears to be around whose responsibility it is to ensure that students possess the required knowledge and skills for entry onto the register and who supports the development of professional capability. A lack of clear *ownership* within the programme has resulted in a lack of acknowledgement by stakeholder groups of their role in supporting development of the capable practitioner and entry to the professional register. Training officers consistently commented that it was the role of the verifier to decide if the student was capable:

> *I think it is the person doing the verification. When they come around its them who is saying whether the student is suitable to be signed-off (FG1TM)*

This suggests that although they are signing the portfolio to state that the student has completed tasks competently, they have delegated the judgement around the student's ability to perform as a BMS in the laboratory environment to the verifier. They do not take responsibility for ensuring that the student is developing as a capable practitioner. The verifier's role is to ensure that the range of evidence gathered by the student for their portfolio is sufficient and appropriate to demonstrate that adequate training, support and assessment have occurred during the work based period of training. It is the role of the training officer who supports the student in the workplace to ultimately assess the student's suitability for entry onto the register. A lack of *ownership* of the role of 'gatekeeper' was also demonstrated by the academics in discussions around the delivery of knowledge and the 'type of knowledge' delivered. When asked about supporting students to make the

connections between theory and practice one academic stated '*why should we be expected to teach them that – it's something that once they are in practice they get (FG2SL1).* This demonstrates a lack of *ownership* of their role within the programme and the intended outcomes of an award linked to professional practice. Work by Fullerton, Thompson and Johnson (2013) identified that awards linked to professional registration require a common definition and identity between stakeholders. Questioning of the data gathered highlights a lack of role definition and shared perceptions of role which is heightened by the lack of integration of the two parts of the curriculum; workplace knowledge is separated from academic knowledge. This perceived separation was clearly demonstrated by comments by one of the academics during the focus group:

> *they [academics] need to know the academic requirements and subject but not the application of them. That is where the lab comes in (FG2AM)*

There is an obvious positioning of the academic role as 'delivering knowledge' to the student. How the student then uses that knowledge is dependent upon the student and the workplace – not the academic.

Ownership of the 'transfer of knowledge' and development of capability is perceived as very firmly the responsibility of the workplace. The expectation is that once the student is in the workplace they will learn how to apply the knowledge delivered during lectures and tutorials to their job role:

> *We are never going to reflect all that here [range of techniques and applications]…Why should we be expected to teach them that – it's something that once they have been in practice they get…. this is something that the student develops whilst on placement (FG2SL1)*

Most tutors articulated an assumption that students will readily make the connections between their academic studies and their application/ relevance in the workplace.

However, research on learning in the workplace has shown that 'learning to practise and learning to use knowledge acquired in education settings does not happen automatically' (Eraut, 2013 p185). This suggests that the lack of *ownership* of the programme results in a major challenge to supporting pre-registration training due to the separation of 'taught' knowledge from 'workplace' knowledge. Higher education has traditionally organised curricula as isolated subjects and this can be seen to be reflected in the separation of academic and practical contexts. A major challenge to any programme is for the quality and delivery of the programme to be valued and owned at all levels by technical and education based stakeholders (Chapple and Aston, 2004). Commitment at all levels is required as well as motivation from all stakeholders with a shared vision of the programme outcomes (Evans *et al.*, 2010). Partnerships are essential to ensure that the knowledge-base from all settings are embedded in and across the programme. The building of relationships is essential, enabled by discourse between stakeholders (Evans *et al.*, 2010).

There is acknowledgement that both groups support different aspects of the trainees' development. However, it was obvious from discussions that practice-based knowledge and the knowledge that is developed during academic studies are seen as independent of each other – separated due to this lack of collaboration between stakeholders. Those supporting learning in each domain often do not recognise the knowledge from the other or have limited experience which hinders their ability to support delivery (Lester and Costley, 2010). Close liaison is required to ensure that all aspects are covered and supported. This lack of interaction is perceived as hindering the delivery of the programme:

> *I think that we rarely see them [training officers] and I think that it is really healthy to have interaction and feedback around the course (I12)*

This is a very important finding. The outcome of this lack of interaction and close liaison between those delivering the programme is an issue of negativity and lack of *ownership* of outcomes of the programme. Socio-cultural learning perspectives rely on relationships between individuals and culture, relying upon the nature of experiences and activities (Tynjala, 2008). Questioning the data allowed me to identify this deeper layer of knowledge conceptualisation and a lack of appreciation of all forms of knowledge and learning. A lack of shared *ownership* results in 'two isolated parts of the programme' and 'two isolated groups' delivering the programme.

However, opportunity does exist within the current programme since development of closer liaison and joint ownership emerged as something which the stakeholders were open to and recognised the need for. One academic clearly identified this need in their comments '*I think that we need close liaison between the academics and training officers (I12)'.*

Addressing this area would enable potential development of the programme by addressing the current separations that have been identified as existing and the lack of ownership for supporting capability development.

5.6 Chapter Summary

This chapter has presented the three theoretical categories to provide an insight into the dynamics within the current programme and the circumstances by which they are shaped. The two strategies identified from the data of *'doing the portfolio'* and '*gaining BMS currency'* provided theoretical centrality and direction for my enquiry. I developed my analysis of supporting learning in and for the workplace starting with participants' concerns and perspectives on the delivery of the current programme: looking at their views and positioning resulting from the range of tensions that they

face. The positioning of participants was identified as causing a narrow, transmission approach to teaching and learning, with the assessment of isolated performance in decontextualized tasks. This was initially attributed to 'lack of time' due to *role conflict* presenting itself as 'pressures of the clinical workload' and the involvement of support grades to deliver training. However, continual memo writing and diagramming assisted me in interpreting the meanings behind actions and comments revealing that positioning was greatly influenced by the lack of development for role, conflicting *expectations* of role and lack of *ownership* of the programme. Importantly, it allowed me to identify that although I had initially referred to the participants in the enquiry as stakeholders, this was not a role that they acknowledged. Reviewing the findings through a socio-cultural lens allows the dichotomies within areas of the programme and between the two strategies to be understood and how these hinder the development of practitioner capability. Positioning has led to adoption of inappropriate pedagogical approaches within the programme. Learning is approached in a mechanistic way with separation between and within contexts. The influence of this fragmentation and disintegration is amplified by a lack of shared '*ownership*' of the programme outcome which has led to a focus upon '*doing the portfolio*' as a strategy to demonstrate suitability to gain occupational status rather than '*gaining BMS currency*' which reflects the capable practitioner.

In the next chapter I use these findings to address my three research questions. I identify the relevance and potential impact of my findings for practice in my field and other programmes linked to pre-registration training and practitioner development. In Chapter Seven I highlight my contribution to knowledge in this field and identify the limitations before suggesting areas for further research.

Chapter Six – Discussion: 'Doing the Portfolio'

6.1 Introduction

This enquiry has explored the delivery of the BSc Biomedical Science award within a framework of changes relating to awards linked to the professions and developments in the NHS driven by patient needs, advances in science and developing technologies. Within this framework of significant challenges and demands upon the NHS workforce the role and expectations of the Biomedical Scientists who are the focus of this enquiry have evolved. The heightened need for a highly skilled and flexible workforce to deliver this advancing provision highlights the importance of supporting the development of the capable practitioner.

This chapter synthesises the findings of the enquiry presented in the previous chapter to address my three research questions and discusses how this empirical research extends current understanding around developing the capable practitioner in BMS. It summarises how dominant theories of learning and teaching within practitioner education have enabled me to theorise the current experiences and practicalities of integrating professional registration for BMS into an academic programme.

I will start by addressing the three research questions (RQ) and in addressing these questions I will highlight the two important strategies identified from the analysis of the empirical data and demonstrate how through eliciting and theorising these I extend understanding of the issues and complex layers involved in integration and delivery of professional BMS training within the current academic and work based programme.

6.2 RQ1: What are the main factors that stakeholders perceive as barriers or opportunities for the current programme?

Participants in the enquiry represented four stakeholder groups; students, training officers, laboratory managers and academics. Each stakeholders' account of their experiences revealed the daily struggles and pressures encountered. Several barriers were perceived as hindering delivery of the current programme and although there were similarities between the experiences of individuals or groups, their perspectives on the impact of the barriers were found to vary and highlighted the difficulties of integrating workplace learning into academic studies (Aitkins, 1999; Gibbs, 2013).

Time and the need to address the professional and regulatory requirements of the programme were recognised by each stakeholder group as barriers to supporting and facilitating learning in the workplace endorsing the findings of previous studies (Billet, 1996; Ellstrom, 2001; Flannagan, Baldwin and Clarke, 2000; Lloyd *et al.*, 2014). Academics complained that '*people seem to forget just how big the degree is*' (I12Ac) raising concerns around the amount of material they are expected to cover. They saw this as compounded by ever-increasing class sizes resulting in them just '*providing a knowledge base'* (I12) which reflects Wolf's (1990, p.41) concerns about occupational based programmes resorting to a focus upon outputs. In the workplace, an increased workload and multiple and conflicting roles '*even the training officers aren't dedicated…. just doing it in their spare time*' (FG5LM), was identified as creating a barrier of time by a laboratory manager mirroring the findings of Lloyd *et al*. (2014) who found that the clinical workload of qualified nurses was prohibitive to supporting trainees.

Students identified how '*doing the day-to-day work'* impacts upon their training time (Memo -Tutorial discussion). For them it is the burden of having to address the standards of proficiency packaged into the portfolio and '*plough through it as quickly as possible'* (I4PS), in addition to working in the laboratory that creates a barrier of time. This positioning reflects Mitchell's (1989, p58) discussion of the pitfalls of a narrow, task orientated approach performed in isolation to practice. The student's comments demonstrate that there is a lack of cognitive engagement with the tasks and a surface rather than deep approach to learning (Ramsden, 2003, p43). Unsurprisingly, addressing the requirements of the portfolio was also identified by training officers and laboratory managers as a further burden for them, separate to practice, and they quite clearly identified that '*the patient samples have always got to come first regardless of the trainee*' (FG3LM1). Such a focus upon functional analysis of tasks and achievement against standards has been identified by others as a major barrier to supporting workforce development (Phelps, Ellis and Hase, 2001; Torr, 2008) with attainment concentrating upon isolated competencies to address standards with a lack of integration into practice (McMullan *et al*., 2006; Brightwell and Grant, 2013).The 'additional workload' of addressing the standards in the form of the portfolio results in training being considered as a 'drain' on time in the workplace evidenced by one laboratory manager's mocking comment '*No lab tests today – we are training'* (FG3LM1).

Another important barrier that emerged from discussions with those tasked with delivering the programme is the lack of support and training they receive for this role. Tynjala (2008) concluded that an integrated and connective pedagogy is only feasible where there is a close partnership and collaboration between educational institutions and the workplaces. During training officer discussions I uncovered a

focus upon career development and progression within the discipline area of biomedical science but not upon the developmental needs as a 'teacher' in the workplace to *'to evidence that I am competent to train other people'* (ITO3). Academics highlighted how they have limited knowledge of professional practice, '*when I go into a lab I see a lot of equipment, it's just all instrumentation* (FG2SL2) preventing them from supporting student transition. Similar issues have been identified in nursing where inappropriate training and preparation for workplace mentors has been shown to be problematic since support mainly focuses upon development of the individual's clinical role (Duffy *et al.,* 2000; Henderson and Eaton, 2013).

Many of the training officers and academics in my enquiry are very committed to the programme and demonstrated a keen interest in supporting improvements, but there is limited 'transactional dialogue' (Brookfield,1986, p.20) which aims to ensure that each group understands each other's workplace culture and dominant language with a sharing of viewpoints and interpretations to develop a real partnership. Recognition of the role of the tutor, and support for tutors to perform that role, is essential for supporting programmes with integrated work based learning (Pitts, Coles and Thomas, 2001; Austin and Braidman, 2008; Bridges *et al.,* 2011; Fullerton, Thompson and Johnson, 2013). I identified that a failure to establish this in the current programme has resulted in participants not recognising or 'buying-in' to the role of stakeholder, clearly evidenced in the academic group by *'why should we be expected to teach them that – it's something that once they are in practice they get' (FG2SL1).* This presents a major unacknowledged barrier since a lack of ownership, interaction and collaboration hinders programme delivery. Issues around this were

highlighted by an academic talking about training officers, *'I think we rarely see them and I think it is healthy to have interaction and feedback around the course'* (I12).

Using CGTM enabled me to reveal and further interpret the complexity within this current situation. The lack of ownership emerging from a failure to establish a stakeholder community can be seen to support a focus upon a positivist epistemology of practice. Abductive questioning identified that within the academic group, delivery of subject knowledge takes precedence and is valued over supporting professional practice: '*academics just need to know the academic requirements and subject but not the application of them. That is where the lab comes in'* (FG2AM). Although lack of time was initially attributed to this approach, the positioning of academics within the positivist paradigm compounds the situation reflecting the technical rationality model defined by Schön (2002, p.48). There is a focus upon a positivist epistemology of practice where basic and applied science comes first. Additionally, I identified that training officers and laboratory managers perceived the role of the workplace as ensuring students could *perform specific tasks* (FG5TO1), again reflecting alignment to a technical rationality model demonstrating a positivist perception of learning within the workplace too. I found that in the more automated laboratory environments with a high throughput of samples this attitude towards learning was more pronounced and clearly summed-up by a training manager's expectation of learning during the placement, '*it's a hands-on job, not producing reports and doing exams'* (FG1TM2).

Many layers of complexity exist around the integration of professional qualifications into degree programmes. Constructing a deeper understanding of the barriers enabled me to address the second research question.

6.3 RQ2: How are approaches adopted for curriculum delivery influenced by these factors?

Revealing the acknowledged and unacknowledged barriers within the current programme enabled an appreciation of the positioning of the stakeholders and an interpretation of the structural, cultural and pedagogic influences on the current programme and delivery of the curriculum.

Understanding of the barrier of the scientific paradigm and the adoption of a positivist epistemology of practice to deliver the curriculum is central to interpreting the approaches adopted by participants in each stakeholder group. I identified that adoption of a positivist approach to learning provides a major but unacknowledged barrier since it has resulted in separation of learning from practice, neglecting other influences and focuses merely upon acquisition of facts or attainment of isolated competencies. This positioning within a 'patriarchal, positivist paradigm' favours a 'passive pedagogy' (Tedesco-Schneck, 2013, p.59) which ignores the socio-cultural aspects of learning. Knowing is separated from doing, evidenced by '*the academic component refers to what we are teaching them to meet our academic needs' (FG2SL)* suggesting a distinct separation of academic and professional requirements and forms of knowledge. Learning in the laboratory has become decontextualized and separated from '*doing the day-to-day work'* (Tutorial discussion), with teaching '*practical competence'* (FG1TM2) and the adoption of a '*tick-sheet'* to verify training (FG1TO1; FG5TO1) discussed by work based trainers. The concept of being does not exist since working in the laboratory is '*black and white not touchy feely*' (FG3LM1), suggesting that working and learning within the laboratory is free from emotion. This approach to learning in the workplace which views competencies as measurable, behavioural outcomes was further illustrated by the description of 'off-

the-shelf' training programmes used within an automated laboratory (10TO). It reflects the 3Rs approach to training defined by Bathmaker and Stoker (1995, p.55) where the students' involvement in practice is limited, ignoring the social context and cultural tools that shape the way in which a person acts of interacts with their environment (Wersch, 1994). Tedesco-Schneck (2013, p.59) suggests that this approach to training is driven by a subconscious need to align with the 'esteemed positivist paradigm of medicine'. The isolation and assessment of tasks to enable transparency and increased accountability provides evidence of this positioning in the BMS programme.

It became clear that reflective practice is not valued by stakeholders in the workplace evidenced by '*I don't know what they are supposed to do'* (ITO10) from a training officer discussing reflective practice, the suggestion that scientists '*do not do reflection*' by a laboratory manager (FG3LM1) and '*its not needed all that much*' suggested by a student (I4PS). The approach reveals an epistemic view of knowledge based upon a technicist construction focusing upon facts and training rather than learning. Since tutors cannot directly observe and measure behaviours such as emotions and thoughts, these are not seen as valid topics and not addressed when viewing learning through a positivist lens. Adoption of a positivist approach has been acknowledged as a feature of traditional curriculums by Fraser and Greenhalgh (2001).

Although the debate in the literature on workplace learning has moved away from the narrow, instrumentalist approach of developing skills and behaviours (Lave and Wenger, 1991; Engestrom, 1996; Guile and Griffiths, 2001) my findings identify that a behaviourist ideology is still dominant in the BMS programme studied with the curriculum itself still positioned within a traditional approach which does not support

capability development. Furthermore, this positioning of both workplace and academic tutors has enabled the registration training portfolio to become an objective measure of training, decontextualized from everyday work, clearly evidenced by comments from each of the stakeholder groups describing how assessment is based upon '*evidence in the portfolio*' rather than the students' '*performance in the laboratory'* (I10TO; I11Ac; I4PS). Although studies suggest that a variety of professions advocate the use of a portfolio approach to support professional practice (Buckley *et al*., 2009: Byrne *et al*., 2009) many studies also warn of the problems faced when the portfolio is employed inappropriately (Paulson *et al.*, 1991; Lam, 2016). The '*writing of bits of evidence*' (I3PS) collected as artefacts to simply demonstrate completion of each assessment and 'signing-off' of each individual area based upon '*whether they have answered some questions that they have been set'* (I10TO) was a recurring theme within conversations with both training officers and students demonstrating this positioning. Such a perception and approach to implementing 'training' has been shown to take the 'artistry' involved in being a practitioner (Schön, 1987, p13) away from practice and relegates the practitioner to a follower of instructions only.

Importantly, I found that the lack of integration of learning into the workplace which allows 'training' to be stand alone to address the portfolio, combined with a failure to ensure that the stakeholders perform their roles, acts to relegate training to a range of staff grades including '*support grades*' (FG4FT3). Since time is perceived as a major barrier to training and '*the work that goes through the laboratory is always going to take priority over training'* (FG3LM) a trade-off between 'productive work' and time for learning occurs. This reflects Ellstrom's (2001) findings that the returns for the workplace from 'learning' are less certain and remote than the rewards from

'production' which in turn increases the emphasis on 'production' (Ellstrom, 2001, p.432). Those training officers and laboratory managers who have worked in the profession for longer, with a greater responsibility for managing the workload, had a strong 'production' focus and perceived training as a hindrance for the day-to-day running of the laboratory on the principle that '*patient samples have always got to come first*' (FG3LM1). This approach to training stands in stark contrast to training officer and laboratory managers' expectation of outcome of the programme; students who can work autonomously and unsupervised (FG1TO2), able to '*juggle several balls all at one time'* (FG3LM1). It highlights an expectation that students should arrive 'oven ready and self-basted' (Aitkins,1999). In addressing the final research questions I discuss how an approach that does not address the socio-cultural aspects of learning as well as the requirement for reflection, impacts greatly on the development of practitioner capability and the BMS student resulting in this disconnect between what is delivered and what is expected.

6.4 RQ3: What is the impact of approaches adopted by stakeholders on the development of practitioner capability?

In addressing the final research question two important strategies adopted emerged; '*doing the portfolio*' and '*gaining BMS currency'*. '*Doing the portfolio'* represents undertaking the 'separated tasks' often '*as quickly as possible'* (I4PS) and having each competency statement signed off to provide an objective record demonstrating that training has been completed. '*Gaining BMS currency'* embraces skills and knowledge required to work in a laboratory setting in addition to the additional skills that are highly valued by employers such as being able to '*juggle several balls at one time'* (FG3LM1) and possess the confidence to apply their learning in new situations (FG1TO2). Crucially, in attempting to address both the acknowledged and

unacknowledged barriers identified, '*doing the portfolio'* has become emblematic of BMS pre-registration learning since it removes anomalies, uncertainties and disparities. The practice of the individual student and their progress during the award '*gaining BMS currency'* which represents what is needed to be a capable practitioner has become lost. Both sides of the coin are required for it to be valid currency and this emphasises the interdependence of structural, cultural and pedagogic influences on practitioner growth. The development of capability through a transformative process where an individual applies existing competencies successfully to new and uncertain circumstances (Fuller and Unwin, 2003) is notably absent from the current approach due to its focus upon separated and isolated competences. Barriers have led to adoption of approaches which focus upon competence rather than capability and the evidence from stakeholder discussions identifies that development of capability is not supported by the current approaches in either the workplace or academic setting.

Shuman's (2005) work on signature pedagogies highlights that the delivery of programmes linked to professional practice, through the teaching and assessment on the award, implicitly define the expected knowledge in the field. The approach identified above falls short of supporting capability since it encourages a focus upon completion of tasks rather than understanding what constitutes good practice and gathering evidence to validate this. The limitations of an acquisition approach which leads to '*a paper exercise'* (FG3FT2) which the student '*plough(s) though as quickly as possible*' (I4PS) were clearly acknowledged by a laboratory manager who identified that a student could have an excellent portfolio leading to registration but did not necessarily demonstrate capability for practice (FG3LM2) The development of autonomy and the ability to make choices are essential skills for the capable

practitioner but can only be developed through an appropriate approach to training (Tikly and Barrett, 2011, p.7). I identified that a lack of an appropriate pedagogical approach means that critical decisions and reflective practice are not addressed (Mitchell, 1989, p.63) and the learner is not supported to make the required connections between theory and practice. This was clearly evidenced by one student discussing tasks they had learnt and '*whether or not I could apply them to work in a range of situations is another thing*' (I2PS). Although disciplinary skills are an essential requirement for entry into the profession and for completion of the everyday workload learning is about more than this. Individuals need to know how the pieces are connected rather than '*individual* [competency] *assessment'* (I2PS) to understand the interactions and relations between all the 'pieces that make up practice' (Fraser and Greenhalgh, 2001). This allows the development of personal identity (Billet and Somerville, 2004) and confidence which are essential skills for the capable practitioner. Through reflection the student can develop situational understanding and intelligent practice (Elliot, 1998, p.124). Like Thompson and Pascal (2012) I was met with the common response from practitioners during focus groups and interviews that '*it comes down to the fact that we don't have the time to spend on these trainees'* (FG3TO1). I identified that to address this, reflection itself has been turned into a procedural process with reflective statements being '*descriptions of what they did in the laboratory'* (I9TO) suggesting the consequence of reflection is achievement of set competences (Boud and Walker, 1988). The 'learning cycle' has been adopted but with alignment to a behaviourist learning outcome demonstrating this lack of acceptance of the role of reflective practice and the limited value placed upon this '*touchy feely'* (FG3LM1) concept. A student highlighted the emphasis placed upon skill development and the portfolio in the

academic setting which leads to '*a lack of focus on you as a person and what you are going to go into*' (I3PS) identifying that the emotional and social needs of practitioner development are not being addressed.

6.5 Chapter Summary

'Doing the portfolio' emerges as a way of describing and conceptualising the stakeholders positioning within the current programme. It allows stakeholders to adopt a positivist stance to both learning and training and a way of addressing role conflict, expectations and ownership. '*Doing the portfolio'* provides stakeholders with a strategy of distancing themselves from both delivery and assessment of professional practice. It provides a theoretical explanation as to how the programme is delivered and why there is a need to rethink conceptualisation of the role of the programme in supporting pre-registration training. The integration of a professional qualification into a programme driven by a positivist approach to problem solving and application to practice has resulted in adoption of methods of teaching that reflect the approaches used for laboratory practice. The portfolio is seen as completing of a process with an end result; the portfolio is the end product just as a 'result' is the end product of processing a sample following set methods. In addressing what is seen as additional to the current programme stakeholders have readily adopted an approach that reflects the typology of practice. Training has become unambiguously packaged into the portfolio which allows it to be treated as an objective, and the only serious, measure of practice. It enables structure and readily reflects the adoption of the professional body standards as a competence framework enabling assessment of individual tasks. '*Gaining BMS currency'* introduces ambiguity and individual differences. There is a need to acknowledge the social aspects of learning and that

learning is context dependent. Adopting this strategy would require a paradigm shift for stakeholders from their positioning in the scientific paradigm, stepping out of their comfort zone and acknowledging the role of socio-cultural interactions and subjectivity in developing professional practice.

In the final chapter I provide an evaluation of my findings and reflect upon the limitations of the enquiry before making recommendations for future practice for the BMS programme and future research.

Chapter Seven - Conclusion

7.1 Introduction

In the previous chapter I addressed the research questions and presented the emergent substantive theory of how pre-registration is currently delivered in the BMS programme and why this approach to curriculum delivery is adopted. My enquiry provides a novel insight into how the stakeholders involved in pre-registration training position themselves in their role through the delineation of three key theoretical categories. Through providing an abstract theoretical understanding of the studied experience I provide an insight into how stakeholders interact with the pressures of both internal and external influences and the impact this has upon behaviours and strategies adopted. In this chapter I focus upon the outcome of my enquiry, make clear the theoretical value of findings and their contribution to the field of study.

The theoretical understanding proposed has a range of implications for practice and importantly for the development of practitioner capability through pre-registration training and beyond. I, therefore, start this chapter with a reflection on the quality of this enquiry. I have drawn upon the work of Kathy Charmaz throughout this enquiry and she proposes four criteria for evaluating grounded theory research (Charmaz, 2014, p.337). I will, therefore, begin by addressing these criteria for my own research before providing a discussion on the limitations of the enquiry. I will then move on to examine my own personal research journey and its relevance before concluding by discussing the implications of this research to workplace learning and supporting the development of capability for professional practice.

The evaluation of a study's findings is based upon the quality of the data and how grounded theory methods have been applied in its collection, generation and analysis (Birks and Mills, 2011, p.145). Having drawn upon the guidance in Charmaz's *Constructing Grounded theory* (2014) to direct my enquiry I have adopted her criteria for evaluation. She proposes four criteria:

- Credibility, which reflects the grounding of concepts and categories within the empirical data.
- Originality, which includes the contribution of the concepts, categories and arguments to extend or challenge existing practices.
- Resonance, which considers to what extent the findings make sense to those involved with or affected by the findings.
- Usefulness, in relation to the development of knowledge and its practical application.

Charmaz suggests that 'a strong combination of originality and credibility increases resonance, usefulness, and subsequent value of contribution' (2014, p. 338).

7.2 Credibility

Credibility is achieved through intimate familiarity with the data, with systematic comparisons being made and strong logical links between the data gathered and the arguments and analysis presented. The reader should be able to form independent assessment and agree with the claims made (Charmaz, 2014, p.337). I have demonstrated credibility throughout this enquiry by providing a visible narrative of the analytic methods (Chapter Four). I have recorded and transcribed *verbatim* the focus groups and interviews with research participants, to ensure that I collected naturally occurring interactions which offer a 'highly reliable record' (Searle and Silverman,

1997, p.380). In presenting the analysis I have demonstrated the systematic coding and constant comparative analysis of data which allowed the development of the theoretical categories. In using excerpts from the participant narratives (Chapter Five and Six) I have demonstrated how my theoretical direction is grounded within the data collected and provided the reader with a clear narrative. Credibility was further improved through gathering data from stakeholders from a range of settings to ensure that findings reflect all groups involved. I have used open-ended questioning during both the focus groups and interview sessions to allow participants to tell their own story. By gathering multiple participant voices and enabling participant reflection on the transcripts I have been able to question findings, critique and obtain feedback (Silverman, 2014, p.93).

7.3 Originality

Originality is the provision of a new conceptual rendering of the data that provides social and theoretical significance that challenges, extends or refines current ideas and practices (Charmaz, 2014, p.337). In my review of the literature I identified very few studies addressing BMSs and their training and none which draw upon a CGTM approach. My use of CGTM as an approach to address work based learning in this area has, therefore, allowed implicit areas to be uncovered and contributes to understanding in this field. Current research in the field is limited to comparing curriculum frameworks for the integration of professional qualifications into BMS awards (Brennan and Little, 1996) or reviewing the changing face of laboratory practice and the pressures impacting upon roles in the clinical environment (Hallworth *et al.*, 2002; Plebani, 2002). CGTM has enabled me to view professional learning and integrated work placements in this field through a different lens by moving away from a spotlight on ‘what should be done’ to identifying ‘what is done’

and ‘why’. In doing this I have made a valuable contribution by elucidating the tensions between the ‘subject culture of BMS’ and the culture required to underpin an effective programme linked to professional registration. I have revealed the current positivist focus, discourse, and implicit scientific assumptions about workplace learning and development of knowledge and skills in the programme: at the heart of my findings is the barrier of positioning of teaching and learning on the award within the positivist paradigm which reflects the typology of laboratory practice. This positioning affords a limited appreciation of the significance of currency as a cultural practice; development of the additional skills highly valued by employers that enable capable practice within the profession

7.4 Resonance

Resonance relates to whether the categories portray the fullness of the studied experience and whether the grounded theory makes sense to the participants of the enquiry to offer them a deeper insight into their worlds (Charmaz, 2014, p.338). I have travelled upon a parallel journey myself to the one required for the stakeholders, and crossed the border between the paradigms. CGTM enabled me to take this journey, acting as a paradigmatic bridge between the two different social ontologies. This suggests that a similar journey is accessible to the stakeholder groups involved in the BMS programme with change being feasible through gradual and supportive internal processes. The positivist and socio-cultural paradigms are not separate and irreconcilable. My findings reveal that the two can be viewed as complementary and parallel; both having a role in helping to frame the approach to supporting the development of the capable practitioner. As a practitioner within this field I am in constant contact with both the participants in this enquiry and others

within the stakeholder groups which afforded regular discussions around my research and the sharing of findings. This helped me to ensure resonance of findings was achieved.

7.5 Usefulness

This relates to whether the enquiry offers interpretations that can be used in practice and whether there are any generic processes. It also relates to how the work contributes to knowledge both within the area of research as well as other substantive areas (Charmaz, 2014, p.338). Previous studies addressing integration of workplace learning into awards that lead to professional qualifications focus mainly upon teaching, nursing, social work and medical training. These professions acknowledge the need for critical reflection upon practice and the socio-cultural aspects of learning due to situating in a ‘people orientated’ rather than ‘process focused’ workplace. A tradition of strong links and collaboration already exist within and between the communities of practice within these professions and stakeholders often work across settings in both the academic and workplace environment. There is, however, limited research into professions sitting more firmly in the positivist paradigm where a collaborative partnership does not already exist and the academic and workplace settings represent very different cultures. Within a framework of an increasing role of HEIs in supporting and enhancing the development of the workforce, my findings offer a contribution to knowledge by questioning in depth whether either the workplace or institution are positioned to deliver on this directive. They offer the potential to develop practices that acknowledge and embrace stakeholder positioning, and the challenges it provides, moving away from the current ‘one-size-fits-all’ approach which assumes that integration of a placement

leading to professional registration into an award will result in everyone ‘knowing’ and ‘delivering’ on what is needed. By making visible the barriers that exist in areas dominated by both technical and mechanistic practice and influenced by external performance indicators the findings make a valuable contribution to future programme development both in the field of BMS and substantive areas.

This enquiry recommends the need for a paradigm shift to address the distinct dichotomy that exists between the scientific paradigm in which biomedical science exists as a discipline and a daily practice, and the socio-cultural concept of learning and knowledge development. Since a curriculum aimed at developing capable practitioners is reliant upon reflective practice as a primary learning vehicle, not an objective portfolio, I identified that a paradigm shift from a positivist episteme to one which recognises the role of reflective practice and the influence of the socio-cultural environment upon learning across the programme is required.

7.6 Paradigm shift

In acknowledging the need for a paradigm shift for successful delivery of the current BMS programme I recognise a parallel with my own journey from positivist to qualitative researcher. My previous experiences of research emphasised objectivity and empiricism. This influenced how I initially approached my data gathering and analysis. As I progressed on my research journey I was required to embrace my own positionality and creativity through new and challenging experiences as well as learning a ‘new’ language of pedagogy through the communities that I joined as part of the professional doctorate. During this journey, I did not reject my ‘*scientistness*’ but embraced its value through still employing quantitative approaches and drawing upon my previous experiences within my methods to support data gathering and

analysis; using flow charts, graphs and clustering diagrams. CGTM enabled me to embrace a range of different methods, even taking a step back and using document analysis to support the development of my skills in questionnaire writing when I struggled with this task. I continued to use familiar tools such as flowcharts to assist me in interpreting data but at the same time developed my understanding of how to conceptualise qualitative data, developing reflexivity in my approach to provide me with theoretical insights. CGTM was instrumental in supporting this journey since initially it provided me with a framework which appealed to my 'positivist tendencies'. The approach to data gathering afforded by this methodology helped me to build methodological skills as evidenced in my focus groups and interview transcripts. In the earlier transcripts my voice was quite dominant and I lacked the skill of 'picking-up' on important points raised, having to return and question on these later. As my confidence and skills developed I explored perceptions, allowing participants' voices to dominate and so gather richer and more illuminating data. Although I soon identified that CGTM was far from a linear process, concurrent data collection and analysis enabled me to go back and ask more questions, to direct my questioning and develop my analytical direction as I progressed on my journey. Most importantly, it did not require me to be an 'expert' in these from the start. As a scientist and a practitioner, I have not rejected a positivist or objective epistemology of practice. I now acknowledge the wider picture, embracing the socio-cultural aspects of learning and the role of questioning and interpretation to develop capability. Importantly, I appreciate that it is not a mutually exclusive concept; I can be *black and white* as well as *touchy feely* within my practice. Recognising this allows me to understand the positioning of stakeholders in my enquiry and supports me to make recommendations for future professional practice.

7.7 Enquiry Limitations

Before addressing recommendations for future practice it is important to identify the difficulties and limitations of this enquiry. In doing this I acknowledge two main limitations. Firstly, except for data gathered from *The BMS* which reflects the opinions of a wide range of professionals within the field of biomedical science and healthcare, all other data is restricted to the one region in which the enquiry was performed and the laboratories that currently support the BMS programme at the university in which I am employed. Not all those involved in the BMS programme in the local region took part in the enquiry. However, due to my own position as an insider-research I feel that I was able to engage participants that represented individuals with a range of roles, perspectives, experience and approaches to allow transferability of findings (Lincoln and Guba, 1985, p.124). The development of a substantive theory in CGT does not claim an objective truth: it is an interpretative portrayal constructed through our interactions with those who have contributed to it (Charmaz, 2014, p.17). The substantive theory that I have developed in this enquiry relates to one region within the NHS but could easily be adopted for further investigation with similar stakeholders from other regions to allow a wider insight into the concepts identified.

Secondly, although I initially approached the professional body (IBMS) to request their participation in the enquiry they declined this invitation but commented that they would be grateful if I could share my findings with them. The lack of involvement of the IBMS as a stakeholder could be seen as a limitation to the enquiry since the Registration Training Portfolio has been developed by them. The practitioner view of the portfolio undoubtedly influenced my theoretical construction and I was unable to gather an alternative perspective to the portfolios role in supporting capability

development. However, as outlined above, this does not detract from the findings and credibility of findings would be enhanced through future research that embraces their perspective.

7.8 Recommendations for future practice

In recognising my own ontological and epistemological journey resulting in a paradigm shift I also identify the need for a similar transition for stakeholders in the current programme. There is a need to embrace an appropriate pedagogical culture and develop an appreciation of its role within their scientific positioning; one that embraces both the '*black and white'* and '*touchy feely*' aspects of practice. I make the following recommendations based upon my own journey to support development of practice. In developing programmes with integrated work based learning, support for employers, participating academics and students must acknowledge and embrace the barriers encountered.

- The separations identified in the current programme must be addressed to remove the focus upon isolated tasks. It is essential to remove the '*doing the portfolio'* approach. Any changes must, however, acknowledge the typology of practice and the essential nature of skill development for BMSs. Improving opportunities for 'productive engagement' in a wide range of work processes is essential to support this (Eraut, 2011).
- A gradual fusion of socio-cultural and positivist approaches to supporting learning is recommended to enable this journey and ensure an appreciation of the role and value of these in supporting development of capability. Stakeholders need to gradually embrace this approach to enable development of expertise to support learning without feeling that they are

losing their own identify as scientists. It should be acknowledged that those involved in work-based learning in the laboratory environment need to have an affinity with epistemologists as well as scientists.

To address these, I make the following recommendations for practice:

- Develop greater involvement and collaboration between the stakeholders delivering the academic portion of the programme and those delivering the work based portion. There is a need to remove both the acknowledged and unacknowledged barriers to allow greater collaboration and sharing of practice. This may involve the following:
    - Enabling academics to spend time within the clinical setting to develop a greater appreciation of current practice within the areas they teach and support the teaching within the workplace.
    - The involvement of training officers and laboratory managers in curriculum review and development of the academic programme. This will ensure that they become partners within this process and so develop ownership of the programme and have a greater appreciation of their contribution.

- The aim of these recommendations is to develop a community of practice where skills and knowledge are shared to enable a ‘cross-over’ and ‘cross-fertilization’ of academic and workplace knowledge and practice. The development of a shared partnership will not only assist in addressing issues around ownership but also help to delineate roles and responsibilities and so address the current disconnect between outcomes and expectations held by stakeholders.

- To ensure that training officers can embrace an appropriate epistemological approach to training there needs to be more formal recognition of the role of the training officer and the skills and knowledge required for the post. There is a need for the development of a recognised qualification to acknowledge individuals' achievement within this role. The professional body must shift their current focus which is upon the development of disciplinary skills only to one which also acknowledges the essential role that trainers in the workplace play in professional development and building the capability of the workforce.
- Situated learning theory views learning as occurring as a result of participation in a 'community of practice' (Lave and Wenger, 1991; Engestrom, 1996). The recommendations for practice above need to ensure that individuals enter such a community and take an active part; not passive observers. Just as studies have identified that it is essential for students to have a personally-valued purpose when on placement in the laboratory engaged critically and reflectively (Edwards, 2005, p.61), the same should be true for all stakeholders of the programme.

CGTM has enabled me to identify the complexity of the current situation. In making recommendations for future research in this area I see the next step being the development and evaluation of the impact of a 'community of epistemological-scientists' which provides support and guidance for all stakeholders and supports a collaborative framework to overcome the current barriers. Since current findings relate to the delivery of the BSc Biomedical Science award in one institution linked to only six NHS Trusts within one region of England the inclusion of additional

institutions covering a wider geographical area plus the involvement of the professional body (IBMS) would add value to further studies.

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References

Aitkins, M., J. (1999) Oven ready and Self-basting: taking stock of employability skills. *Teaching in Higher Education.* 4(2), pp.267-280

Allen, M. (2011) Violence and voice: using a feminist constructivist grounded theory to explore women's resistance to abuse. *Qualitative Research.*11(1), pp. 23-45

Allmark, P. (1995) A classical view of the theory-practice gap in nursing. *Journal of Advanced Nursing*. 22, pp.18-23

Alvesson, M. and Skoldberg K. (2010) *Reflexive Methodology: New Vistas for Qualitative Research*. London: Sage Publications.

Artino, R., Larochelle, J., Dezee, K., Gehlbach, H.(2014) Developing questionnaire for educational research: AMEE Guide No. 87. *Medical Teacher*. 36(6), pp.463-474

Austin, C. and Braidman, I. (2008) Support for portfolio in the initial years of the undergraduate medical school curriculum: What do the tutors think? *Medical Teacher*. *30*(3), pp.265-271

Bamber, A. (2010) The state of pathology: can it be improved? *The Biomedical Scientist.* (August), pp.556-559

Basit, T. (2010) *Conducting research in Educational Contexts*. London: Continuum International Publishing Group.

Bates, I. (1995) The Competence Movement: Conceptualising Recent Research *Studies in Science Education*. 25 (1), pp. 39-68

Bathmaker, A.and Stoker,D (1999) Towards capability through competence: autonomy or automatism. In: O'Reilly, D., Cunningham, L. and Lester, S. (eds) *Developing the Capable Practitioner: Professional capability Through Higher Education*. London: Koogan Page Ltd, pp.54-60

Beach, K. D. (1999). Consequential transitions: A sociocultural expedition beyond transfer in education. *Review of Research in Education*. 24, pp.101–139.

Beckett, D. (2000) Making workplace Learning Explicit: an epistemology of practice for the whole person. *Westminster Studies in Education*. 23, pp.41-53

Beckett, D. and Hager, P. (2000) Making judgments as the basis for workplace learning: towards an epistemology of practice. *International Journal of Lifelong Education*. 19(4), pp.300-311

BERA (2011) *Ethical Guidelines For Educational Research*. British Education Research Association. London: Endsleigh Street

Biggs, J. (2003) *Teaching for Quality Learning at University* (Society for Research into Higher Education) 3rd Ed. Open University Press

Billett, S. (1996) Towards a model of workplace learning: the learning curriculum. *Studies in Continuing Education*. 18(1), pp.43-58

Billett, S. (2002) Critiquing workplace learning discourses: participation and continuity at work. *Studies in the Education of Adults*. 34(1), pp.56-67

Billet, S. and Somerville, M. (2004) Transformations at work: Identity and Learning. *Studies in Continuing Education* 26, pp.309-326

Birks, M. and Mills, J. (2012) *Grounded Theory: A Practical Guide*. London: Sage Publications Ltd.

Bleakley, A. (2006) Broadening conceptions of learning in medical education: the message from teamworking *Medical Education.* 40(2), pp.150-157

Bolton, G. (2010) *Reflective Practice: Writing And Professional Development* (3rd ed) London: Sage Publishing Ltd.

Bonner, A. and Tolhurst, G. (2002). Insider-outsider perspectives of participant observation. *Nurse Researcher*. 9(4), pp.7-19.

Boud,D., Keogh, R. and Walker, D. (1996) *Reflection: Turning Experience into Learning.* London: Koogan Page Ltd.

Boud, D., and N. Solomon (2001) *Work-based learning: a new higher education?* (1st ed.) Buckingham: Open University Press

Boud, D, and Walker, D. (1998) Promoting reflection in professional courses: The challenge of context. *Studies In Higher Education.* 23(2), pp.191-206

Boud, D. and Walker, D. (2002) Promoting reflection in professional courses: the challenge of context In: Harrison, R., Reeve, F., Hanson, A. and Clarke, J. (eds) *Supporting Lifelong Learning Vol. 1, Perspective on Learning*. London: The Open University, Routledge Falmer. pp. 91-110

Braun, V. and Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology.* 3(2), pp.77-101

Brennan, J. and Little, B. (1996) *A Review of Work based Learning in Higher Education,* London: Quality Support Centre and Open University

Brennan, J. and Little, B. (2006) *Towards a Strategy for Workplace Learning*: Report of a study to assist HEFCE in the development of a strategy for workplace learning. London: Centre for Higher Education Research & Information.

Brennan, K. and Lennie, S. (2010) Students' experience and perceptions of the use of portfolio in UK preregistration dietetic placements: a questionnaire-based study. *Journal of Human Nutrition and Dietetics*. 23(2), pp.133-143

Bridges, D.R., Davidson, R.A., Odegard, P.S., Maki, I.V. and Tomkowiak, J. (2011) Interprofessional collaboration: three best practice models of interprofessional education. *Medical Education Online* [Online] 16, pp.1-10 [Accessed 24th August, 2014}. Available at: http://www.tandfonline.com/toc/zmeo20/current

Brightwell, A. and Grant, J (2013) Competency-based training: who benefits? *Postgrad Med J*. 89, pp.107-110

Bristol Royal Infirmary Inquiry (2001) Learning from Bristol: the report of the public inquiry into children's heart surgery at the Bristol Royal Infirmary 1984 -1995 [Accessed 16th May 2013]. Available at: http://webarchive.nationalarchives.gov.uk/20090811143745/http://www.bristol-inquiry.org.uk/index.htm

Brodie, P., and K. Irving. 2007. Assessment in work based learning: Investigating a pedagogical approach to enhance student learning. *Assessment & Evaluation in Higher Education*. 32(1), pp.11–19

Brookfield, S. (1986). *Understanding and facilitating adult learning: A comprehensive analysis of principles and effective practice*. San Francisco: Jossey-Bass.

Browne, J. (2010) *Securing a Sustainable Future for Higher Education: An Independent Review of Higher Education Funding & Student Finance*. [Accessed 8th June 2013]. Available at: http://dera.ioe.ac.uk/11444/1/10-1208-securing-sustainable-higher-education-browne-report.pdf

Bryan, R., Krych, A., Carmichael, S., Viggiano, T. and Pawlina, W. (2005) Assessing Professionalism in Early Medical Education: Experiences with Peer Evaluation and Self-evaluation in the Gross Anatomy Course. *Ann Acad Med Singapore.* 34, pp.486-91

Bryans, P. and Smith, R. (2000) Beyond training: Reconceptualising learning at *work Journal of Workplace Learning.* 12(6), pp.228-235

Bryant, A. (2003). A Constructive/ist Response to Glaser *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*. [Online] 4(1) [Accessed 4th June 2015] Available at http://nbn-resolving.de/urn:nbn:de:0114-fqs0301155 .

Bryant, A. and Charmaz, K. (2012) Grounded Theory in Historical Perspective: An epistemological Account. in: Bryant, A. and Charmaz, K. (eds) *The Sage Handbook of Grounded Theory.* London: Sage Publications Ltd. pp.31-57

Buckley, S., Coleman, J., Davison, I., Khan, K., Zamora, J., Malick, S., Morley, D., Pollard, D., Ashcroft, T.,Popovic, C. and Sayers. J. (2009) The education effects of portfolios on undergraduate student learning: A Best Evidence Medical Education (BEME) systematic review. BEME Guide No. 11 *Medical Teacher.* 31, pp..340-355

Burke, J. (1990) *Competency Based Education and Training.* London: The Falmer Press. pp.1-9

Byrne, M., Schroeter, K., Carter, S. and Mower, J. (2009) The professional portfolio: an evidence-based assessment method. *Journal of Continuing Education in Nursing*. 40(12), pp.545-552.

Cairns, L. (1999) Quality and Diversity in VET Research: The capability Perspective *AVETRA Conference Papers* [Online] [Accessed 14th June 2013]. Available at: http://www.avetra.org.au/abstracts_and_papers/10_CAIRNS.pdf

Cairns, L. and Malloch, M (2013) Theories of Work, Place and Learning: New Directions. In: Malloch, M., Cairns, L.,Evans, K. and O'Connor, B. (eds) *The Sage Handbook of Workplace Learning*. London: Sage Publications Ltd. pp.3-16

Carryer, J., Gardner, G., Dunn, S. and Gardner, A. (2007) The capability of nurse practitioner may be diminished by controlling protocols. *Aust. Health Rev* 31(1), pp.108-115

Charmaz, K. (1983) Loss of Self: a Fundamental Form of Suffering in the Chronically Ill. *Sociology of Health and Illness*. 5(2), pp.168–195.

Charmaz, K. (2005) Grounded Theory in the 21st Century: Applications for Advancing Social Justice Studies. In Denzin, N. and Lincoln, Y. (eds) *The Sage Handbook of Qualitative Research*, 3rd Ed, London: Sage Publications Ltd. pp. 507-536

Charmaz. K. (2006) *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. London: Sage Publications Ltd.

Charmaz, K. (2008). Constructionism and the grounded theory method. In Holstein J. A. & Gubrium J. F. (eds.). *Handbook of constructionist research*. New York: The Guilford Press. pp.397-412

Charmaz, K. (2011a) Grounded Theory Methods in Social Justice Research. In Denzin, N. and Lincoln, Y. (eds) *The Sage Handbook of Qualitative Research*, 4th Ed, London: Sage Publications Ltd. pp.359-380

Charmaz, K. (2011b) A Constructivist Grounded Theory Analysis of Losing and Regaining a Valued Self. In: Wertz, F., Charmaz, K., McMullen, L., Josselson, R., Anderson, R. and McSpadden, E. (eds) *Five Ways of Doing Qualitative Analysis: Phenomenological Psychology, Grounded Theory, Discourse Analysis, Narrative Research, and Intuitive Inquiry.* New York, London: The Guildford Press. pp165-204

Charmaz. K. (2014) Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis (2nd Ed) London: Sage Publications Ltd.

Charmaz, K. (2016) The Power of Constructivist Theory for Critical Inquiry. *Qualitative Inquiry*. 23(1), pp. 34-45

Clandinin, D. J. and Connelly, F. M. (1998), Stories to Live By: Narrative Understandings of School Reform. *Curriculum Inquiry*. 28(2), pp.149–164

Clarke, A.E. (1997) A Social Worlds Research Adventure In. Strauss, A. and Corbin, J. (eds) *Grounded theory in practice*. London: Sage Publications Inc. .pp.63-94

Cleland, J., Reeve, J., Rosenthal, J. and Johnstone, P. (2014) Resisting the tick box culture: refocusing medical education and training. *Br J Gen Pract* , 64 (625), pp.422-423

Chapple, M. and Aston, E.S. (2004) Practice learning teams: a partnership approach to supporting students' clinical learning. *Nurse Education in Practice*. 4, pp.143-149

Cohen, L., Manion, L., and Morrison, K. (2007). *Research Methods in Education*. London: Routledge/ Falmer

Corbin, J. and Strauss, A. (1990) Grounded theory Research: Procedures, Cannons and Evaluative Criteria. *Qualitative Sociology.* 13(1), pp.418-427

Corbin, J. and Strauss, A. (2008) *Qualitative Research 3E: Techniques and Procedures for Developing Grounded Theory*. London: Sage Publications

Covan, E. (2012) The Discovery of Grounded Theory in Practice: The Legacy of Multiple Mentors. In: Bryant, A. and Charmaz, K. (eds) The Sage Handbook of Grounded Theory. London: Sage Publications Ltd. pp.58-74

Cousin, G. (2009) *Researching Learning in Higher Education*. Abingdon, Oxon: Routledge.

Crotty, M. (1998) *The Foundations of Social Research: Meaning and Perspective in the Research Process*. London: Sage Publications Ltd.

Darzi, A. (2008a) High quality care for all: NHS Next Stage Review final report. [Accessed 8th June 2012] Available at: http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_085828.pdf

Darzi, A. (2008b) NHS Next Stage Review: A High Quality Workforce. [Accessed 8th June 2012] Available at: http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_085841.pdf

Davis, M., Ben-David, M., Harden, R., Ker, P., McGhee, C., Pippard, M. and Snadden, D. (2001) Portfolio assessment in medical students' final examinations. *Medical Teacher*. 23(4), pp.357-366

Davis, L. and Hase, S. (2001) 'The river of learning in the workplace', Proceedings of Research to Reality: *Putting VET Research to Work*: Australian Vocational Education and Training Research Association (AVETRA), Adelaide, SA, 28-30 March, AVETRA, Crows Nest, NSW [Accessed 14th June 2013] Published version available from: http://www.avetra.org.au/Conference_Archives/2001/proceedings.shtml

Dearing, R. (1997) The National Committee of Inquiry into Higher Education [Accessed 8th June 2012] Available at: http://www.leeds.ac.uk/educol/ncihe/

Denzin, N. (1989) *The Research Act. A Theoretical Introduction to Sociological Methods.* (3rd Ed) New Jersey: Prentice –Hall, Inc.

Denzin, N. (2012) Grounded Theory and the Politics of Interpretation In: Bryant, A. and Charmaz, K.(eds) *The Sage Handbook of Grounded Theory*. London: Sage Publications Ltd. pp.454-471

Denzin, N. and Lincoln Y. (2011) *The Sage Handbook Of Qualitative Research* (4th Ed) London: Sage Publications

Department of Health (1997) The New NHS: modern, dependable. Department of Health. [Accessed on 18th December 2016] Available at: https://www.gov.uk/government/publications/the-new-

Department of Health (1998) A first Class Service: Quality in the New NHS. [Accessed 18th December 2016] Available at: http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/publicationsandstatistics/publications/publicationspolicyandguidance/dh_4006902

Department of Health (1999) Making a Difference: strengthening the nursing, midwifery and health visiting contribution to health and healthcare. [Accessed 18th December 2016] Available at: http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4007977

Department of Health (2000) The NHS Plan: A Plan for Investment. A Plan for Reform. [Accessed 18th December 2016] Available at: http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/publicationsandstatistics/publications/publicationspolicyandguidance/dh_4002960

Department of Health (2001a) Working together, learning together: a framework for lifelong learning for the NHS. [Accessed 18th December 2016] Available at: http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/publicationsandstatistics/publications/publicationspolicyandguidance/dh_4009558

Department of Health (2001b) Making the Change: a strategy for the professions in healthcare science. [Accessed 18th December 2016] Available at: http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4010607

Department of Health (2004) Modernising pathology services. [Accessed 18th December, 2016] Available at: http://webarchive.nationalarchives.gov.uk/+/dh.gov.uk/en/publicationsandstatistics/publications/publicationspolicyandguidance/dh_4073106

Department of Health (2012) Developing the Healthcare workforce: From Design to Delivery. [Accessed 18th December 2016] Available at: https://www.gov.uk/government/publications/developing-the-healthcare-workforce-from-design-to-delivery

Dewey, J. (1938) *Experience and Education*. The Kappa Delta Pi Lecture Series. A Touchstone Book, Simon & Schuster

Dick, B. (2012) What Can Grounded Theorists and Action Researchers Learn from Each Other? In: Bryant, A. and Charmaz, K. (eds) *The Sage Handbook of Grounded Theory.* London: Sage Publications. pp.398-416

Duffy, K., Docherty, C., Carnduff, L., White, M., Winters, G., Greig, J. (2000) The nurse lecturer's role in mentoring the mentors. *Nursing Standard*. 15 (6), pp..35-38.

Edwards, A (2005) Let's get beyond community and practice: the many meanings of learning by participating. *The Curriculum Journal*. 16(1), pp.49-65

Edwards, B. (2002) ‘Deep insider research’. *Qualitative Research Journal*. 2(1), pp.71–84

Elliot, J. (1991) *Action Research for Educational Change*. Milton Keynes: Open University Press

Elliott, J. (1998) *The Curriculum Experiment. Meeting the Challenge of Social Change*. Milton Keynes: Open University Press.

Ellstrom, P. (2001) Integrating learning and work: Problems and prospects. *Human Resource Development Quarterly.* 12(4), pp.421- 435

Endacott, R., Gray, M., Jasper, M., McMullan, M., Miller, C., Scholes, J. and Webb, C. (2004) Using portfolios in the assessment of learning and competence: the impact of four models. *Nurse education in Practice.* 4, pp.250-257

Engestrom, Y. (1996) Development as breaking away and opening Up: A challenge to Vygotsky and Piaget. *Swiss Journal of Psychology.* 55(2), pp.126-132

Engestrom, Y (2001) Expansive Learning at Work: toward an activity theoretical reconceptualization *Journal of Education and Work*. 14(1), pp.133-156

Engestrom, Y. (2011) Activity Theory and Learning at Work. In: Malloch, M., Cairns, L., Evans, K. and O’Connor, B. (eds) *The Sage Handbook of Workplace Learning*. London: Sage Publications Limited. pp.86-104

Epstein RM, Hundert EM. (2002) Defining and Assessing Professional Competence. *JAMA.* 287(2), pp.226-235.

Eraut, M. (2000), Non-formal learning and tacit knowledge in professional work. *British Journal of Educational Psychology*. 70, pp.113–136

Eraut, M. (2005) Schön Shock: a case for refraining reflection-in-action? *Teacher and Teaching: Theory and Practice*.1(1), pp.9-22

Eraut, M. (2007) Learning from other people in the workplace. *Oxford Review of Education*. 33(4) pp.403-22

Eraut, M. (2011) Informal learning in the workplace: evidence on the real value of work-based learning (WBL). *Development and Learning in Organizations.* 25(5), pp.8-12

Eraut, M. (2013) How Researching Learning at Work Can Lead to Tools for Enhancing Learning. In: Malloch, M., Cairns, L., Evans, K. and O’Connor, B. (eds) *The Sage Handbook of Workplace Learning*. London: Sage Publications Limited. pp.181-197

Eraut, M. and Hirsh, W. (2007) *The significance of workplace learning for individuals, groups and organisations*. SKOPE Monograph 9, Oxford University Department of Economics, Oxford: Oxford University Press.

Evans, K (2002) The challenges of ‘making learning visible’: problems and issues in recognising tacit skills and key competencies: In Evans, K, Hodkinson, P and Unwin,

L (eds): *Working to learn, transforming learning in the workplace* London: Koogan Page Limited, pp.79-94

Evans, K., Guile, D., Harris, J. and Allan, H. (2010) Putting knowledge to work: A new approach. *Nurse Education Today*. 30(3), pp.245–251

Evans, K., Guile, D. and Harris, J. (2013) Rethinking Work-Based Learning: For Education Professionals and Professionals Who Educate. In: Malloch, M., Cairns, L., Evans, K. and O'Connor, B. (eds) *The Sage Handbook of Workplace Learning*. London: Sage Publications Limited. pp.149-161

Evans, K., Hodkinson, P., Rainbird, H. and Unwin, L. (2006) *Improving Workplace Learning (Improving Learning)*. Abingdon, Oxon: Routledge.

Fernandez, N., Dory. Ste-Marie, L., Chaput, M., Charlin, B. and Boucher, A. (2012) Varying conceptions of competence: an analysis of how health sciences educators define competence. *Medical Education in Review.* 46, pp.357-365

Flanagan, J., Baldwin, S. and Clarke, D. (2000) Work-based learning as a means of developing and assessing nursing competence. *Journal of Clinical Nursing.* 9(3), pp.360-368

Foster, E. and Stephenson, J. (1998) Work-based Learning and Universities in the U.K.: a review of current practice and trends. *Higher Education Research & Development.* 17(2), pp.155-170

Fraser, S. and Greenhalgh, R. (2001) Coping with complexity: educating for capability. *BMJ,* pp.323-799

Freeman, R. E. (1984) *Strategic management: A stakeholder approach*. Boston: Pitman.

Fuller, A, Hodkinson, B, Hodkinson, P and Unwin, L (2005) Learning as peripheral participation in communities of practice: a reassessment of key concepts in workplace learning. *British Educational Research Journal*. 31(1), pp.49–68

Fuller, A and Unwin, L (2002) Developing pedagogies for contemporary workplace: In Evans, K, Hodkinson, P and Unwin, L (eds) *Working to learn, transforming learning in the workplace.* London: Koogan Page Limited. pp.95-111

Fuller, A and Unwin L. (2003) Fostering Workplace Learning: looking through the lens of apprenticeship. *European Educational Research Journal*. 2(1), pp. 41-55

Fuller, A. and Unwin, L. (2013) Workplace Learning and the Organisation. In: Malloch, M., Cairns, L., Evans, K. and O'Connor, B. (eds) *The Sage Handbook of Workplace Learning*. London: Sage Publications Limited .pp.46-59

Fullerton, J., Thompson, J. and Johnson, P. (2013) Competency-based education: The essential basis of pre-service education for the professional midwifery workforce. *Midwifery* 29 (10), pp.1129-1136

Furness, S. and Gilligan, P. (2004) Fit for purpose: issues from practice placements, practice teaching and the assessment of students' practice. *Social Work Education*. 23(4), pp.465-479

Gardner, A., Hase, S., Gardner, G., Dunn, S.V., and Carryer, J. (2008). From competence to capability: A study of nurse practitioners in clinical practice. *Journal of Clinical Nursing*, 17(2), pp.250-258

Garrick, J. and Usher, R. (2000) Flexible learning, Contemporary Work and Enterprising Selves *Electronic Journal of Sociology* [Online] [Accessed, 23rd February 2012] Available at: http://www.sociology.org/content/vol005.001/garrick-usher.html

Garvin, D., Edmondson, A. and Gino, F. (2008) Is Yours a learning Organisation? *Harvard Business Review*. 86(3), pp.109–116.

Gerrish, K., McManus, M., Ashworth, P.D. (1997) Levels of achievement: a review of the assessment of practice. *Research and Professional Education Series*. 5. English National Board for Nursing Midwifery and Health Visiting, London

Gibbs, G. (2013) Reflections on the changing nature of educational development. *International Journal for Academic Development*. 18(1), pp. 4-14

Glaser, B. (1978) *Theoretical Sensitivity*, California: The Sociology Press.

Glaser, B. (2002) Conceptualisation: On theory and theorizing using grounded theory *International Journal of Qualitative Methods* 1(2) Article 3. [Accessed 23rd February 2014] Available at http://www.ualberta.ca/~ijqm/

Glaser, B. (2010) The Future of Grounded Theory1. *The Grounded Theory Review.* 9(2), pp.1-14

Glaser, B. and Strauss, A. (1967) T*he Discovery of Grounded Theory, Strategies for Qualitative Research*. New Brunswick: Aldine Transaction Publishers.

Glencross, H., Ahmed, N. and Wang, Q. (2012) Biomedical Science Practice: Experimental and professional skills. Oxford: Oxford University Press

Goulding, C. (1999) *Grounded Theory: some reflections on paradigm, procedures and misconceptions. Working Paper Series* June 1999, University of Wolverhampton, ISSN 1363-689 [Accessed 15th July 2016] Available at: http://wlv.openreposibristoltory.com/wlv/bitstream/2436/11403/1/Goulding.pdf

Greenhalgh, T., & Hurwitz, B. (1999). Why study narrative? *BMJ : British Medical Journal*. *318*(7175), pp.48–50.

Greene, M. (2014) On the Inside Looking In: Methodological Insights and Challenges in Conducting Qualitative Insider Research. *The Qualitative Report*, 19, pp.1-13

Greenwood, J. (1993) Reflective practice: a critique of the work of Argyris and Schön. *Journal of Advanced Nursing.* 18(8), pp.1183-1187

Griffiths, T. and Guille, D. (2003) A Connective Model of Learning: the implications for work process knowledge. *European Educational Research Journal*. 2(1), pp. 56-73

Guile, D. and Griffiths, T. (2001) Learning through Work Experience. *Journal of Education and Work*. 14, pp.113-131

Hager, P. (2004) Lifelong learning in the workplace? Challenges and issues. *Journal of Workplace Learning*. 16(1/2), pp.22-32

Hager, P. (2013) Workplaces and Learning. In: Malloch, M., Cairns, L., Evans, K. and O'Connor, B.(eds). *The Sage Handbook of Workplace Learning*. London: Sage Publications Limited. pp.17-31

Hager, P. and Hyland, T. (2003) Vocational Education and Training. In: N. Blake, P. Smeyers, R. Smith & P. Standish (eds.) *The Blackwell Guide to the Philosophy of Education*. Oxford: Blackwell. pp.271-281

Halliday, J. (2004) Competence in the Workplace: Rhetorical robbery and curriculum policy. *Educational Philosophy and Theory.* 36(5), pp. 579-590

Hallworth, M., Hyde, K., Cumming, A. and Peake, I. (2002) The future for clinical scientists in laboratory medicine. *Clinical & Laboratory Haematology*. 24, pp.197–204

Harris, P., Dolan, G. and Fairbairn, G. (2001) Reflecting on the use of student portfolios *Nurse Education Today,* 21(4), pp.278-286

Harvey, L., Moon, S. and Geall, V with Bower, R., 1997, *Graduates' Work: Organisation change and students' attributes*. Birmingham, Centre *for* Research *into* Quality (CRQ) and Association of Graduate Recruiters (AGR).

Hase, S. (2000) 'Measuring organisational capability', AVETRA conference, Sydney, March. [Accessed 16th December 2014] Available at Http://www.avetra.org.au/Conference_Archives/2000/abstracts.shtml

Hase, S. and Davis, L. (1999) 'Developing capable employees: the work activity briefing'. *Journal of Workplace Learning*. 11(8), pp.298-303.

Hase, S. and Kenyon, C. (2001) Moving From Andragogy to Heutagogy: Implications for VET, AVETRA, Adelaide, March. [Accessed 16th December2014] Available at http://www.avetra.org.au/Conference_Archives/2001/abstracts.shtml

Hase, S. and Kenyon, C. (2007) Heutagogy: A Child of Complexity Complicity. *International Journal of Complexity and Education*. 4(1), pp.111-118

Health Professions Council (2014) Standards of Proficiency [Accessed 24th January, 2017] Avaiable at: http://www.hpc-uk.org/assets/documents/100004FDStandards_of_Proficiency_Biomedical_Scientists.pdf

Henderson, A. and Eaton, E. (2013) Assisting nurses to facilitate student and new graduate learning in practice settings: What 'support' do nurses at the bedside need? *Nurse Education in Practice*. 13(3), pp.197-201

Hodges, B. (2006) Medical education and the maintenance of incompetence. *Medical Teacher*. 28(8), pp.690-696

Hodkinson, H and Hodkinson, P (2005) Improving schoolteachers' workplace learning. *Research Papers in Education*. 20(2), pp.109-131

Holmes, L. (1999) Competence and capability: from 'confidence trick' to the construction of graduate identity. In: O'Reilly, D., Cunningham, L. and Lester, S. (Eds) *Developing the Capable Practitioner, Professional Capability Through Higher Education.* London; Koogan Page Ltd. pp. 83-98

Holstein, J. and Gubrium, J. (2005) Interpretive Practice and Social Action. In Denzin, N. and Lincoln, Y. (eds) The Sage Handbook of Qualitative Research, 3rd Ed, London: Sage Publications Ltd. pp. 483-506

Holton, J. (2012) The Coding Process and Its Challenges In: Bryant, A. and Charmaz. K. (eds) The Sage Handbook of Grounded Theory. London: Sage Publications Ltd. pp.265-290

Hsiung, P (2008) Teaching Reflexivity In Qualitative Interviewing. *Teaching Sociology.* 36, pp.211-226

Institute of Biomedical Science (2013) Registration Training Portfolio 3rd Ed (v2) [Accessed 24th January 2017] Available at: https://www.ibms.org/resources/documents/ibms-registration-training-portfolio-3rd-edition-reference-copy/

Institute of Biomedical Science (2016) Criteria and Requirements for the Accreditation and Re-accreditation of BSc (Hons) in Biomedical Science. [Accessed 24th January 2017] Available at: https://www.ibms.org/resources/documents/criteria-and-requirements-for-the-accreditation-and-re/

Institute of Biomedical Science (2017a) Accredited Degrees. [Accessed 24th January 2017] Available at https://www.ibms.org/qualifications/accredited-degrees/

Institute of Biomedical Science (2017b) Certificate of Competence for HCPC registration. [Accessed 20th January 2017] Available at: https://www.ibms.org/qualifications/certificate-of-competence/

Institute of Biomedical Science (2017c) Information of verifiers and examiners. [Accessed 5th February 2017] Available at: https://www.ibms.org/qualifications/information-for-verifiers-and-examiners/

Institute of Biomedical Science (2017d) Advance your career with an IBMS Certificate of Expert Practice [Accessed 5th February 2017] Available at: https://www.ibms.org/qualifications/higher-and-expert-qualifications/certificate-of-expert-practice-online/

Ixer, G. (1999) There's No Such Thing As Reflection. *The British Journal Of Social Work.* 29(4), pp. 513-527

James, P. and Mulcahy, D. (2000): Competency-based training and beyond: action research and reflective practice in vocational education and training. *Educational Action Research*. 8(3), pp.515-532

Jones S., Hill K. (2003). Understanding patterns of commitment: Student motivation for community service. *Journal of Higher Education*, 74(5), 516–539

Kamberelis, G. and Dimitriadis, G. (2011) Focus Groups: Contingent Articulations of Pedagogy, politics and Inquiry. In Denzin , N. and Lincoln, Y. (eds) *The Sage Handbook of Qualitative Research*. London: Sage.

Kanuka, H. (2010) Deliberative Inquiry. In: Savin-Baden, M. and Howell Major, C. (eds) *New Approaches to Qualitative Research: Wisdom and uncertainty*. Abingdon, Oxon: Routledge. pp.545-562

Karlowicz K. (2000) The Value of Student Portfolios to Evaluate Undergraduate Nursing Programs. *Nurse Educator.* 25(2), pp. 82-87

Kelle, U. (2005). "Emergence" vs. "forcing" of empirical data? A crucial problem of "grounded theory" reconsidered. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research* [Online] 6(2), Art. 27 [Accessed 6th December 2016] Available at http://nbn-resolving.de/urn:nbn:de:0114-fqs0502275

Kennison, M. (2006) The Evaluation of Students' Reflective Writing for Evidence of Critical Thinking. Nursing Education Perspectives. 27(5), pp.269-273

Lafrance, J.,Gray, E., and Herbert, M. (2004). Gate-keeping for professional social work practice. *Social Work Education*. 23, pp.325-340.

Lam, R., 2016. Taking stock of portfolio assessment scholarship: From research to practice. *Assessing Writing*. [Accessed 7th December 2016] Available at http://dx.doi.org/10.1016/j.asw.2016.08.003

Lave, J and Wenger, E (1991) *Situated Learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.

Lavender, G. (2008) Pathology Modernisation Under the Microscope: Reflecting on Modernisation. *The Biomedical Scientist* (August) pp.700-702

Leitch, S. (2006) Leitch review of Skills: Prosperity for all in the global economy – world class skills [Accessed 3rd March 2012] Available at: http://www.delni.gov.uk/leitch_finalreport051206[1]-2.pdf

Lester, S. (1995) Beyond Knowledge and Competence towards a framework for professional education. *Capability.* 1(3), pp. 44-52

Lester, S (1999) From map-reader to map-maker: approaches to moving beyond knowledge and competence. In O'Rellly, D., Cunnignham, L. and Lester, S. (eds) *Developing the Capable Practitioner – Professional Capability Through Higher Education*. London: Kogan Page, pp. 45-53

Lester, S. (2014) Professional standards, competence and capability. *Higher Education, Skills and Work-based Learning* 4(1), pp.31 - 43

Lester, S. and Costley, C., (2010). Work-based learning at higher education level: Value, practice and critique. *Studies in Higher Education*. 35(5), pp.561-575.

Leung, W. (2002) Competency based medical training: review. *BMJ* 325(7366), pp.693-696

Lincoln, Y.S. and Guba, E.G. (1985) *Naturalistic Inquiry*. London: SAGE Publications.

Lizzio, A and Wilson K (2004) Action learning in Higher Education: an investigation of its potential to develop professional capability. *Studies in Higher Education*. 29(4), pp.469-488

Lloyd B, Pfeiffer D, Dominish J, Heading G, Schmidt D, McCluskey A. (2014) The New South Wales Allied Health Workplace Learning Study: Barriers and enablers to learning in the workplace. *BMC Health Services Research*.14:134.

Lum, G. (2003) Towards a Richer Conception of Vocational Preparation *Journal of Philosophy of Education*. 37(1), pp.1-15

Madjar, I. and Walton, J. A. (2001) What is problematic about evidence? In: Morse, J. M., Swanson, J.M. and Kuzel, A.J. (eds) *The Nature of Qualitative evidence.* Thousand Oaks CA: Sage Publishing Inc. pp28-47

Marsick, V. and Watkins, K. (2001) Informal and Incidental Learning. In: Merriam, S. (ed) *The New Update on Adult Learning Theory: New Directions for Adult and Continuing Education, Number 89.* California: Jossey-Bass. pp.25-34

Martin, E (1998) Conceptions of Workplace University Education. *Higher Education Research & Development.*17(2), pp.191-205

Martin, J. (2009) West Midlands training officers' workshops: a one-day meeting. *The Biomedical Scientist* (November) pp.959-960

Martin, J. (2013) Training the trainers: combined Aston, Coventry and Wolverhampton universities portfolio peer review. *The Biomedical Scientist* (June) pp.348-349

Marshall, K. (1991) NVQs: An Assessment of the 'Outcomes' Approach to Education and Training, *Journal of Further and Higher Education*. 15:3, pp.56-64

May, S. (2011) Developing the Healthcare workforce. *The Biomedical Scientist* (January) pp.2

McMinn, A. and Russell, G. (1975) Training of Medical Laboratory Technicians: A Handbook for Tutors [Accessed on 4th June 2015] Available at: http://eric.ed.gov/?id=ED117316

McMullan, M., (2006). Students' perceptions on the use of portfolios in pre-registration nursing education: a questionnaire survey. *International Journal of Nursing Studies.* 43(3), pp.333-343.

McMullan, M., Endacott, R., Gray, M., Miller, C., Scholes, J. and Webb, C. (2003) Portfolios an assessment of competence: a review of the literature. *Journal of Advanced Nursing.* 41(3), pp.283-294

McNiff, J. and Whitehead, J. (2011) *All You Need To Know About Action Research* (2nd Ed) London: SAGE Publishing.

Merriam, S.B., Johnson-Bailey, J., Lee, M.Y., Kee, Y., Ntseane, G. and Muhamad, M., (2001). Power and positionality: Negotiating insider/outsider status within and across cultures. *International Journal of Lifelong Education*. 20(5), pp.405-416.

Mills, J., Francis, K. and Bonner, A., (2008). Getting to know a stranger—rural nurses' experiences of mentoring: A grounded theory. *International Journal of Nursing Studies*. 45(4), pp.599-607.

Mitchell, L. (1989) The Definition of Standards and their Assessment. in: Burke, J. (ed) Competency Based Education and Training. London: The Falmer Press. pp.54-64

Moon, J (2008) Critical Thinking: An Exploration of Theory and Practice. Abingdon, Oxon: Routledge

Moore, L. (2000) Ethical and organisational tensions for work-based learners. *Journal of Workplace Learning*. 19(3), pp.161-172

Morcke, A., Dornan, T. and Eika, B. (2013) Outcome (competency) based education: an exploration of its origins, theoretical basis, and empirical evidence. *Adv in Health Sci Educ.* 18, pp. 851–863

Morse, J. (2011) What is Qualitative Health Research? In: In Denzin, N. and Lincoln, Y. Eds. *The Sage Handbook of Qualitative Research*. London: Sage. pp.401-414

Morse, J. (2012) Sampling in Grounded Theory. In: Bryant, A. and Charmaz, K. (eds) The Sage Handbook of Grounded Theory. London: Sage Publications Ltd. pp.229-244

Mugaloglu, E. and Doganca, Z (2009) Fulfilling the "missing link" between university and authentic workplace in teacher training. *Journal of Workplace Learning*. 21(6), pp.455 – 464

Newland, A. (2008) Carter Review and Beyond. *The Biomedical Scientist* (January) pp.22-23

NHS Careers (2013) Biomedical science [Accessed 14th May 2013] Available at: http://www.nhscareers.nhs.uk/explore-by-career/healthcare-science/careers-in-healthcare-science/careers-in-life-sciences/biomedical-science/

NHS Confederation (2013) Changing Care, improving quality: Reframing the debate on reconfiguration. [Accessed 23rd July 2013] Available at :

http://www.aomrc.org.uk/publications/statements/doc_view/9692-changing-care-improving-quality.html

Olssen, M., and Peters, M. (2005) Neoliberalism, Higher Education and the Knowledge Economy: From the free market to knowledge capitalism. *Journal of Education Policy* 20 (3), pp.313 – 347

Orr, K. and Yun, G. (2011) Becoming and Architect: the role of work-based learning in architect training. In: International Conference on Researching work and Learning, December 4-7, 2011, East China Normal University, Shanghai, China. (Unpublished) [Accessed 20th May, 2015] Available at: http://eprints.hud.ac.uk/12212/

Packer, M. and Goicoechea,J. (2000) Sociocultural and Constructivist Theories of Learning: Ontology, Not just Epistemology. *Educational Psychologist* 35(4), pp.227-241

Paulson, F., Paulson, P. and Meyer, C. (1991) What makes a Portfolio a Portfolio? *Educational Leadership* 58:5, pp. 60-63

Pearson, D and Heywood, P. (2004) Portfolio use in general practice vocational training: a survey of GP registrars. *Medical Education* .38, pp. 87-95

Pellat, G. (2006) Nursing mentors. The role of mentors in supporting pre-registration nursing students. *British Journal of Nursing*. 15 (6), pp.336–340

Phelps, R. (2002) Capability versus competency in information technology education: challenging the learning context for lifelong technological literacy. In Cope, B. and Kalantziz (eds) *Learning for the future: proceedings of the Learning Conference 2001* (Eighth Interactional Literacy & Education Research Network Conference on Learning), Dimotiko Skolio of Spetses, Greece, 4-8 July 2001, Common Ground Publishing, Altona, Vic.

Phelps, R, Ellis, A & Hase, S (2001) The role of metacognitive and reflective learning processes in developing capable computer users. In: G Kennedy, M Keppell, C McNaught & T Petrovic (eds) *Meeting at the crossroads: proceedings of the 18th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education* (ASCILITE), 9-12 December 2001, University of Melbourne, Vic., Biomedical Multimedia Unit, University of Melbourne, Melbourne, Vic., pp. 481-490

Phelps, R. and Hase, S (2002) Complexity and action research: exploring the theoretical and methodological connection. Educational Action Research. 10(3), pp.507-524

Phelps, R., Hase, S. and Ellis, A. (2005) Competency, capability, complexity and computers: exploring a new model for conceptualising end-user computer education *British Journal of Educational Technology* 36(1), pp. 67-84

Pitts, J. Coles, C. and Thomas, P. (2001) Enhancing reliability in portfolio assessment: `shaping' the portfolio. *Medical Teacher.* 23(4), pp.351-356

Pillow, W. (2003) Confession, catharsis, or cure? Rethinking the uses of reflexivity as methodological power in qualitative research. *Qualitative Studies in Education.* 16(2), pp.175–196.

Pitt, S. and Cunningham, J. (2010) Co-terminus/integrated BSc degree programmes: employers' views. *The Biomedical Scientist* (April) pp.273-276

Plebani, M. (2002) Charting the course of medical laboratories in a changing environment. *Clin Chim Acta*. 319(2), pp.87-100

Professions Supplementary to Medicine Act (1960) [Online] [Accessed June 16th 2013] Available at: http://www.legislation.gov.uk/ukpga/Eliz2/8-9/66/section/3

QAA (2007) The Quality Assurance Agency for Higher Education 2007. Available at: http://www.qaa.ac.uk/en/Publications/Documents/Subject-benchmark-statement-Biomedical-science.pdf Accessed June, 2013

Raelin, J (2007) Toward and Epistemology of Practice. *Academy of Management Learning & Education*.6(4), pp.495-519.

Ramsden, P. (2003) *Learning to Teach In Higher Education* (2nd Ed) New York: RoutledgeFalmer

Reichertz, J. (2012) Abduction: The Logic of Discovery of Grounded Theory. in: Bryant, A. and Charmaz, K. (eds) *The Sage Handbook of Grounded Theory.* London: Sage Publications Ltd. pp. 214-228

Rico, G. (2000) *Writing the Natural Way*. New York: Penguin Putman Inc.

Rugg, G. and Petre, M. (2007) *A gentle guide to research methods*. Milton Keynes: Open University Press

Sbaraini, A., Carter, S., Evans, R. and Blinkhorn, A. (2011) How to do a grounded theory study: a worked example of a study of dental practices *BMS Medical Research Methodology.* 11:128

Schön, D. (1983) *The Reflective Practitioner – How professionals think in action*. England: Arena

Schön, D. A. (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*. San Francisco: Jossey-Bass

Schön, D. (2001) The Crisis of Professional Knowledge and the Pursuit of an Epistemology of Practice. In: Raven, J. and Stephenson, J. (eds) *Competence in the Learning Society*. New York: Peter Lang. pp.185-207

Schön, D. (2002) From Technical Rationality to reflection-in-action. In: Harrison, R., Reeve, F., Hanson, A. and Clarke, J. (eds) *Supporting Lifelong Learning, Volume 1, Perspectives on Learning*. London: The Open University. pp.40-61

Scott, D. (1996). Making judgements about educational research, In: Scott, D. and Usher, R. (eds). *Understanding educational research*. London: Routledge. pp. 74-87

Searle, C. and Silverman, D. (1997) Ensuring rigour in qualitative research. *European Journal of Public Health* 7(4), pp.379-384

Sfard, A (1998) On two metaphors of learning and the dangers of choosing one *Educational Researcher.* 27(2), pp.4-13

Shulman, L. (2005) Signature pedagogies in the professions. *Daedalus*. 134(3), pp.52-50

Silverman, D. (2014) *Interpreting Qualitative Data*. London: Sage Publications Inc.

Simmons, J., Brüggemann, A.J. and Swahnberg, K. (2016) Disclosing victimisation to healthcare professionals in Sweden: a constructivist grounded theory study of experiences among men exposed to interpersonal violence *BMJ Open*. 6:e010847. doi: 10.1136/bmjopen-2015-010847

Snadden D. (1999) Portfolios – Attempting to measure the unmeasurable? [Commentary]. *Med Educ*. 33(7), pp.478–479

Snadden, D., and Thomas, M.L. (1998). The use of portfolio learning in medical education. *Med Teach*. 20, pp.192–199

Smith, S. and Martin, J. (2014) Practitioner capability: Supporting critical reflection during work-based placement – a pilot study*. Higher Education, Skills and Work-based Learning.* 4(3), pp.284 – 300

Smyth, A. and Holian, R. (2008). Credibility Issues in Research from within Organisations. In: Sikes, P. an Potts, A. (eds.) *Researching education from the inside.* New York: Taylor & Francis. pp. 33-48

Spouse, J. (2001) Bridging theory and practice in the supervisory relationship: a sociocultural perspective. *Journal of Advanced Nursing*. 33(4), pp.512-522

Star, S.L. (2012) Living Grounded Theory. In Bryant, A. and Charmaz, K. (eds.) *The Sage Handbook of Grounded Theory.* London: Sage Publications Ltd. pp.75-94

Strauss, A., & Corbin, J. (1994). Grounded theory methodology: An overview. In N. Denzin & Y. Lincoln (eds.), *Handbook of qualitative research* Thousand Oaks, CA: Sage. pp.273-285

Stephenson, J. (1994) 'Capability and Competence: Are they the same and does it matter?' *Capability.* 1(1), pp.3 - 4.

Stephenson, J. (1998) The Concept of Capability and its Importance in Higher Education. In: Stephenson, J. and Yorke, M. (eds) *Capability and Quality in Higher Education*. London: Routledge. pp. 1-13

Tedesco-Schneck, M. (2013) Active learning as a path to critical thinking: Are competencies a roadblock? 13(1), pp.58-60

Tikly, L. and Barrett, A. (2011) Social justice, capabilities and the quality of education in low income countries. *International Journal of Educational Development.* 31, pp.3–14

Thomas, D. and Brown, J.S. (2009) Why Virtual Worlds Can Matter. *International Journal of Learning and Media.* 1(1), pp.37-49

Thompson, N. and Pascal, J. (2012) Developing critically reflective practice. *Reflective Practice*. 13(2), pp.311-325

Thornberg. R. (2012) Informed Grounded Theory *Scandinavian Journal of Educational Research*. 56(3), pp.243-259

Trigwell,K., Prosser, M. and Waterhouse, F.(1999) Relations between teachers' approaches to teaching and students' approaches to learning. *Higher Education* 37, pp.57-70

Torr, A. (2008) 'A complex view of professional competence', presented at 17th National Vocational Education and Training Research Conference, NCVER, Adelaide. [Accessed 14th August 2014] Available at http://www.voced.edu.au/content/ngv38681

Torrance, H. (2007) Assessment *as* learning? How the use of explicit learning objectives, assessment criteria and feedback in post-secondary education and training can come to dominate learning. *Assessment in education: Principles, Policy & Practice.* 14(3), pp.281-294

Tuxworth, E. (1989). 'Competence based education and training: background and origins.' In: Burke, J. W. (ed) *Competency Based Education and Training.* London: Falmer Press, pp.10-25.

Tynjala, P. (2008) Perspectives into learning at the workplace. *Educational Research review.* 3(2), pp.130-154

Usher, R. (1996) Textuality and reflexivity in educational research. In: Scott, D. and Usher, R. (eds) *Understanding educational research*. London: Routledge. pp.33-51

Vygotsky, L.S. (1978) *Mind in Society: the development of higher mental processes* Cambridge: Harvard University Press

Wainwright, A. (2011) University/employer liaison committees: the future is in your hands. *The Biomedical Scientists*. (March) pp.192-193

Walter, J.G. and Gerson, H. (2007). Teachers' personal agency: making sense of slope through additive structures. *Educational Studies in Mathematics*, 65(2), pp.203-234

Watson, R., Stimpson, A., Topping, A. and Porock, D. (2002) Clinical competence assessment in nursing: a systematic review of the literature. *Journal of Advanced Nursing.* 39(5) pp.421-431

Webster-Wright, A. (2009) Reframing Professional Development Through Understanding Authentic Professional Learning. *Review of Educational Research*. 70(2), pp.702-739

Wellington, J. (2000*) Educational Research – Contemporary issues and Practical Approaches*. London: Continuum

Wenger, E. (1998) *Communities of practice: learning, meaning and identity*. Cambridge: Cambridge, University Press

Wenzel, L., Briggs, K., and Puryear, B. (1998). Portfolio: Authentic assessment in the age of the curriculum revolution. *Journal of Nursing Education*. 37(5), pp.208-212

Wertsch, J.V. (1994) The primacy of mediated action in sociocultural studies. *Mind, Culture, and Activity* 1(4), pp.202-208

Wildman, P. (1996). From student competencies to regional capability. *Capability*, 2(1), pp.85-91

Williams, C. (2010) Understanding the essential elements of work-based learning and its relevance to everyday clinical practice. *Journal of Nursing Management*. 18, pp.624–632

Willig, C. (2001). Introducing Qualitative Research in Psychology: Adventures in theory and method. Buckingham: Open University Press

Wisker, G. (1996) Assessment for learning: encouraging personal development and critical response on a writing module by student-centred assessment and teaching/learning strategies. *Innovations in Education and Training International.* 33, pp.58-65

Wolf A. (1989) Can competence and knowledge mix? In: Burke, J. (ed) *Competency Based Education and Training*. London: Falmer Press. pp.39-53

APPENDICES

Appendix 1 –Information sheet for questionnaire participants

This is a copy of the information provided to questionnaire participants providing them with details of the enquiry to obtain informed consent.

I am currently undertaking a study to look at both approaches to delivering pre-registration training and the support provided to those with responsibility for this training. The aim of the study is to identify and disseminate good practice, areas where additional support /guidance/resources are required and to ensure that there is successful delivery of pre-registration training (both academic and work based).

I would be really grateful if you could complete the attached questionnaire. All responses are anonymous and can be returned to me either by email or post. Neither the Trust nor the individuals completing the questionnaire will be identified.

The results from a range of Trusts within the region will be collated and used to form the basis for a focus group discussion. I will ensure that all results and discussions are communicated with a contact within your Trust, allowing you to feedback or comment if required. All comments or feedback to support the study will be gratefully received.

Your support is appreciated.

Thank you

Appendix 2 – Questionnaire

This is a copy of the questionnaire circulated to individuals in the Training officer and laboratory Manager stakeholder group.

BSc Biomedical Science award - Integrated Work based Training for professional registration - Questionnaire

(All information provided within this questionnaire will be treated as confidential and all responses will remain anonymous.)

About you and your laboratory:

1. Which of the following best defines your current role/post? (you may tick more than one category if required)

   ☐ Lab manager

   ☐ Team leader

   ☐ Training officer

   ☐ Senior BMS

   ☐ Other (please expand)

2. How many years' experience do you have as a registered BMS? ☐

3. Which discipline(s) do you work within? ☐

4. How many members of staff work within your department?

   ☐

5. How long have you been responsible for supporting pre-registration training?

   ☐

6. Do you have time allocated within your workload for supporting pre-registration training?

   Yes ☐ No ☐

   If Yes – How many hours per week? ☐

7. How much time on average do you spend per week on supporting pre-registration training?

8. Who else within your department is involved in supporting and assessing trainees during their workbased placement?

	Training	Assessing
Laboratory Manager	☐	☐
Band 7 BMSs	☐	☐
Band 6 BMSs	☐	☐
Band 5 BMSs	☐	☐
MLAs	☐	☐
Other	☐	☐

9. Have those involved in training (including yourself) received any support or training for undertaking this role within your department?

Yes ☐ No ☐

If Yes – please provide details of courses/meetings/training etc and the staff grades involved

10. What do you think are the main barriers to supporting BMS pre-registration training within your workplace? Rate the following:

	Never	Occasionally	Most of the time	Always
Time				
Resources for teaching				
Staffing levels				
Support for delivering training				
Lack of clear advice on what is needed				
Lack of communication with University				
Paperwork				
Preparation of student for placement/workplace				
Student commitment				
Registration Training Portfolio				
Other (*please expand*)				

11. Which programme of training did **you** undertake to become a registered BMS?

☐ HND/Logbook

- ☐ BSc/Logbook
- ☐ Accredited degree /Portfolio
- ☐ Degree/Top-ups/Portfolio
- ☐ Other (please expand)

Pathway to registration – the following questions relate to the current pathway of accredited degree and laboratory experience leading to Certificate of Competence

12. The academic curriculum provides:	**Agree**	**Tend to Agree**	**Tend to disagree**	**Disagree**
The knowledge required to be a registered BMS				
The skills required to be a registered BMS				
In-depth knowledge of each of the main pathology disciplines				
Preparation of students for suitable employment in the field of biomedical science				
Support for completion of the Registration Training Portfolio				
Support for the development of employability skills				

13. The workbased curriculum provides:	**Agree**	**Tend to Agree**	**Tend to disagree**	**Disagree**
The knowledge required to be a registered BMS				
The skills required to be a registered BMS				
In-depth knowledge of each of the main pathology disciplines				
Preparation of students for suitable employment in the field of biomedical science				
Support for completion of the Registration Training Portfolio				
Support for the development of employability skills				

14. Thinking about the importance of the 'academic portion' vs. 'workbased portion' of the programme for developing the capable BMS, place a cross on the line below to represent your perception of the relative values of each component.

Academic portion most important — **50:50** — Workbased portion most important

Approaches to supporting pre-registration learning

15. A range of approaches can be employed to support learning. Please identify which of the following approaches you use :

	Never	Occasionally	Regularly	Main approach
Provision of a workplace mentor				
Provision of sets of exercises where the skills and competence of the individual can be assessed to ensure they fully understand a process				
Use of a reflective journal by trainee to identify progress				
Continuous assessment of skills via a range of tests				
Continuous assessment of knowledge via a range of tests				
Trainee becomes part of the workplace team and takes part in all areas of routine laboratory work				
Structured training programme mapped to competencies within the portfolio				

16. What has influenced your approach to training?	Disagree	Tend to disagree	Tend to agree	Agree
My approach is influenced by how I was trained				
We have always done it like this				
The requirements of the registration training portfolio				
The requirements of the laboratory				
Other – please expand				

Thank you for completing the questionnaire

Appendix 3 - 'Ice-breaker' Tool (Questionnaire responses summary)

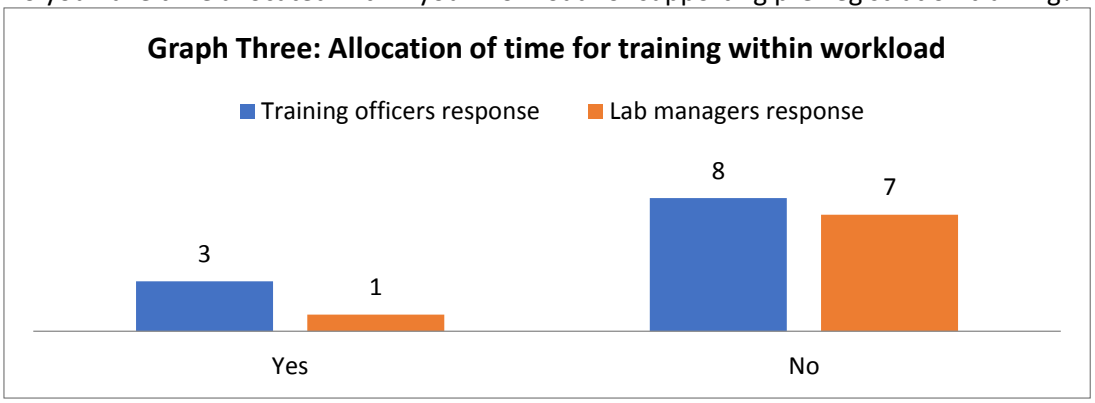
In addition to using the responses to the questionnaire to support category development and provide direction to the study, I also used a summary of the questionnaire as an 'ice-breaker' tool. The use of quantitative data to stimulate discussions with groups of scientists was seen as epistemologically appropriate. Charmaz (2014) proposes four criteria for evaluation of a study's findings. Resonance is one of these criteria which relates to what extent the findings make sense to those involved with or affected by a study. The tables and graphs below were presented to the focus groups initially and questions were asked about what the data meant to the participants, how they interpreted the responses and whether they agreed. This helped to stimulate conversation and acted as a paradigmatic bridge from quantitative analysis of the current experiences to a qualitative approach.

Questionnaire Summary

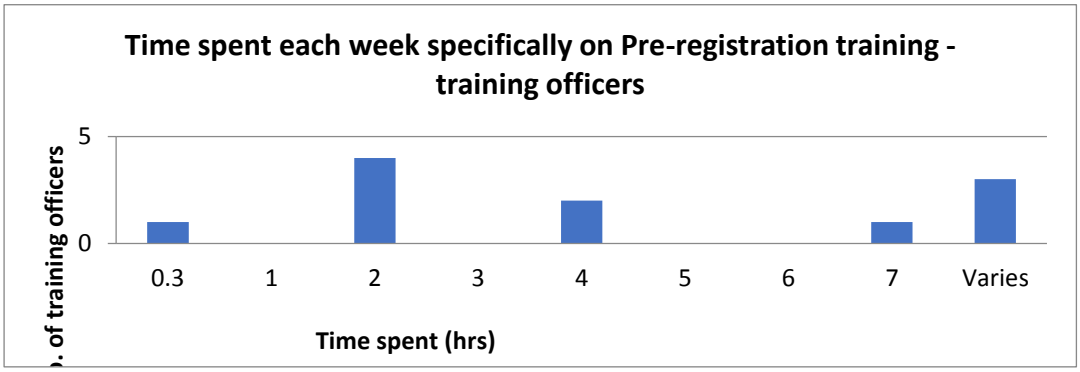
1. Which of the following best defines your current role/post?

Respondents	Number
First year students	20
Final year students	16
Pre-registration Trainees (workbased portfolio)	13
Training Officers (TOs)	11
Laboratory Managers (LMs)	8
Academics	7
TOTAL	**75**

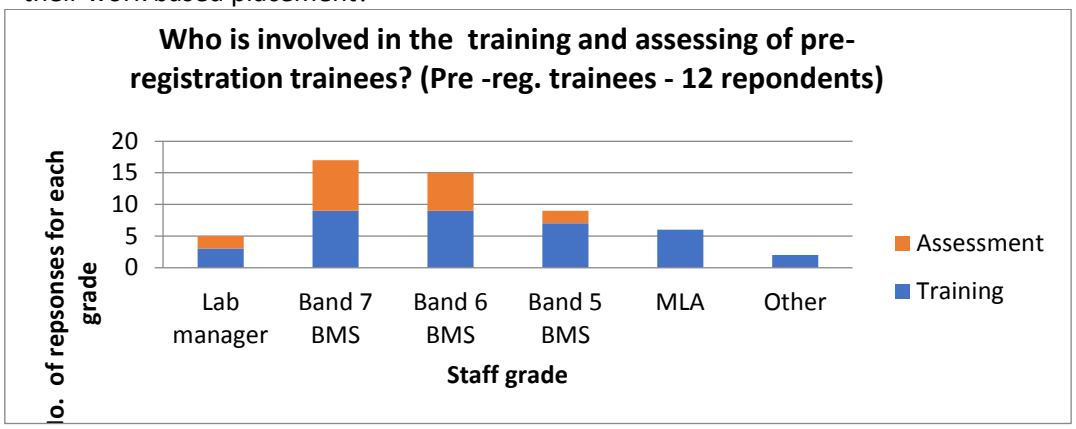
2. Do you have time allocated within your workload for supporting pre-registration training?

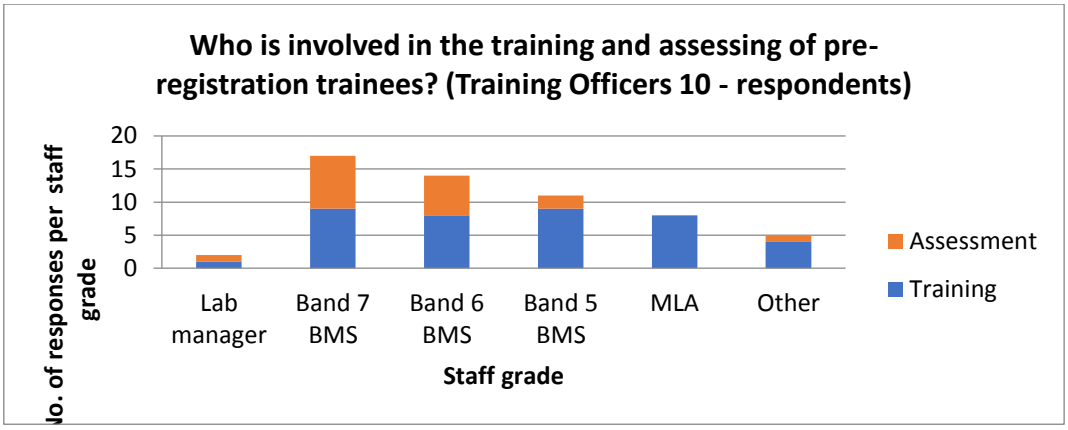


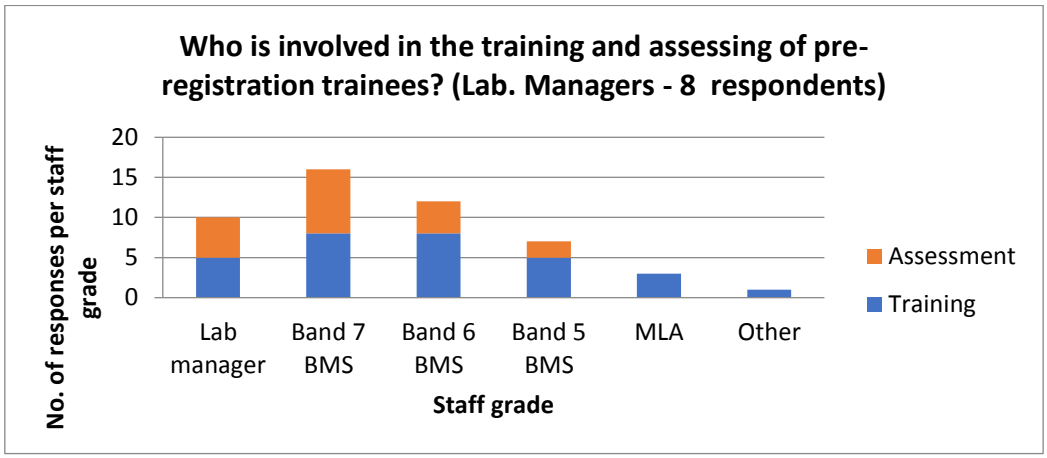
3. How much time on average do you spend per week on supporting pre-registration training?



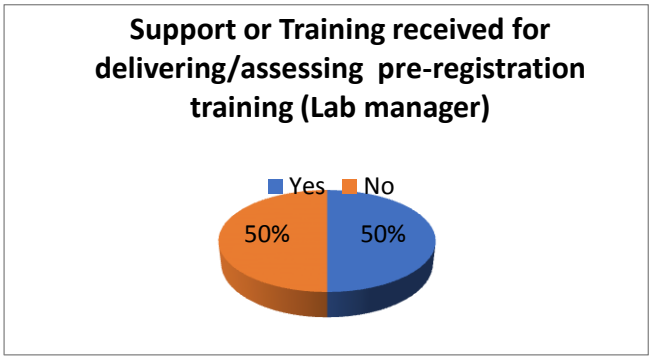
4. Who else within your department is involved in supporting and assessing trainees during their work based placement?

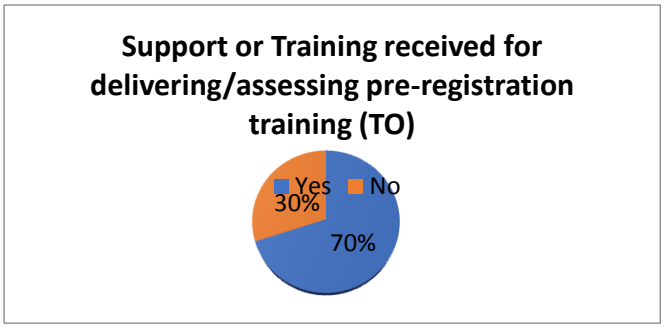






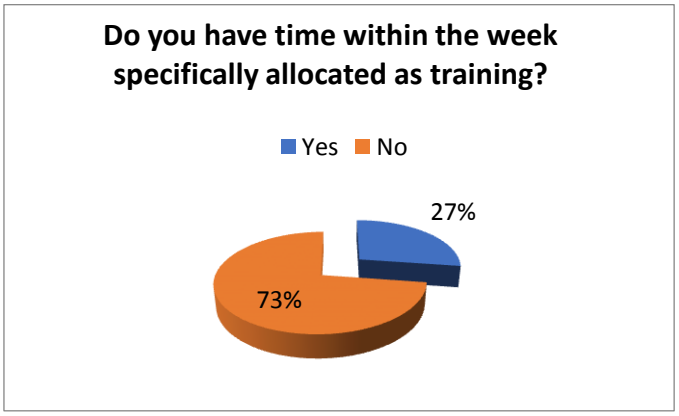
5. Have those involved in training (including yourself) received any support or training for undertaking this role within your department?





Many responded that they had received training – IBMS certificate, TTT or In-house training for supporting trainees – but other grades of staff had not received direct training (e.g. BMS 5 and 6 with no specific training role and MLAs

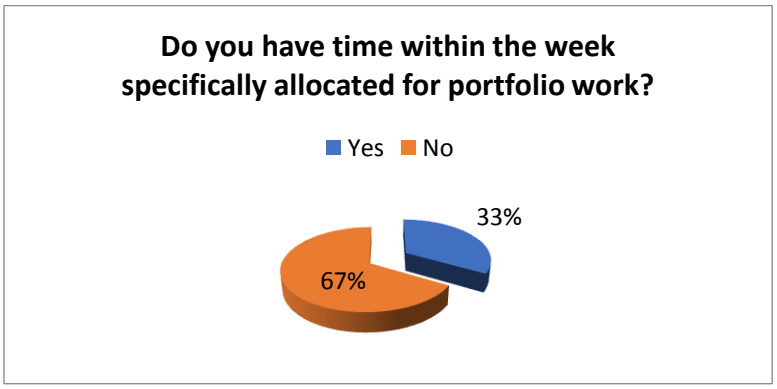
6. **Students:** Do you have time allocated specifically for training or portfolio work?



Training = Timetable with plan of training for year so know where I am and what areas being covered

= timetable at start but then it did become a bit ad hoc 'when and where' training

= supervised training provided in a number of areas



Portfolio = one day per week for writing assignments and review of marked work + personal study

= access to computer to complete tasks and write reflections.

= Use of imaginary samples to complete specific tasks for portfolio competencies

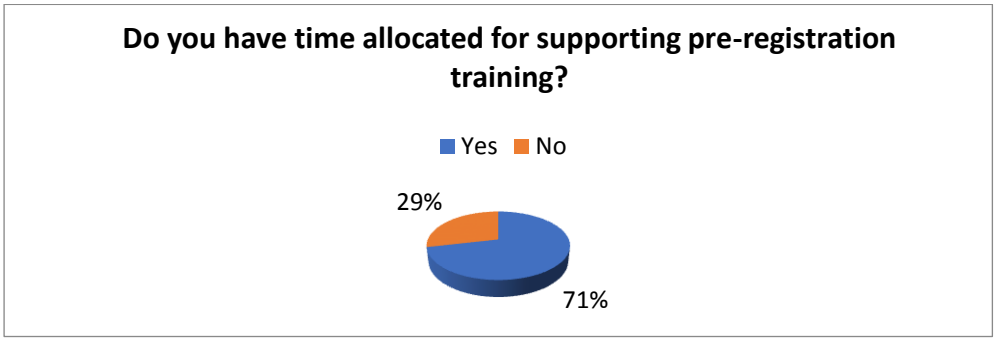
= Half day for self-directed work on sections of portfolio

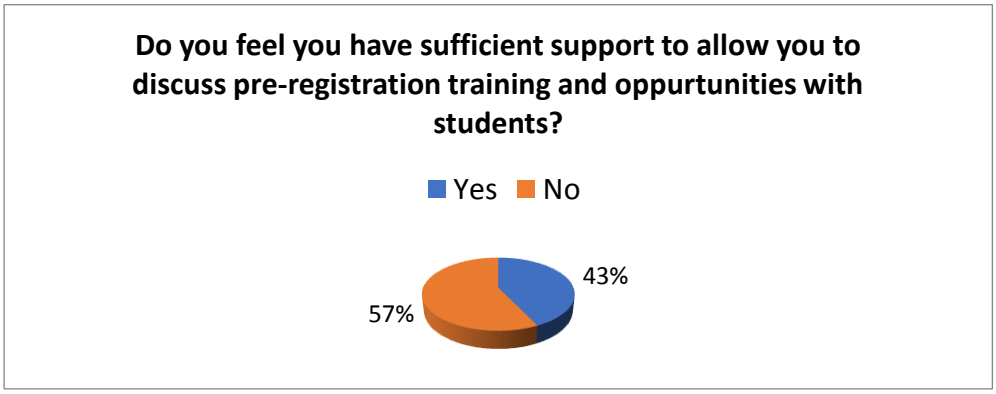
Yes responses all relate to year-long placement students. PT students all stated 'No' to both questions. One response stated that the work got in the way of training

7. **Academics** –

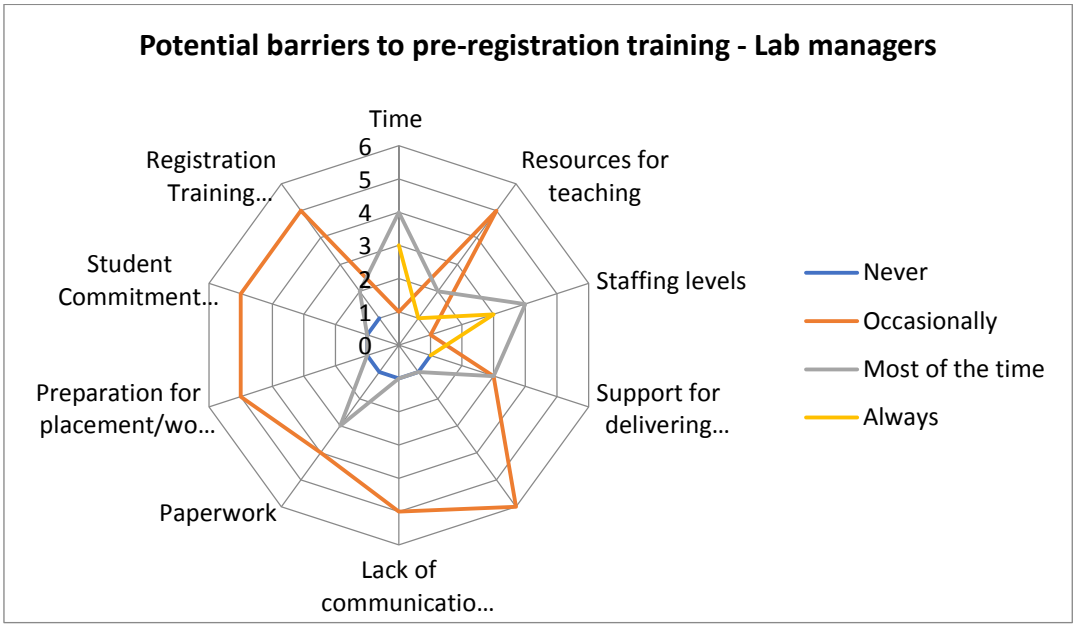
Do you have time allocated within your workload for supporting pre-registration training?

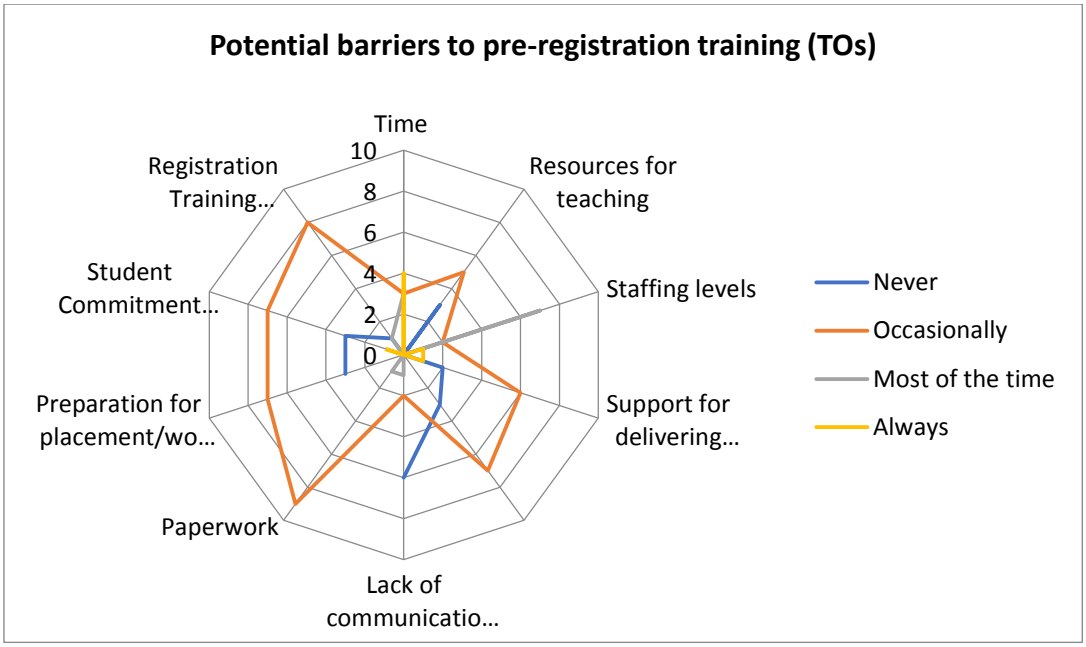
Do you feel that you are provided with sufficient support and information to allow you to discuss pre- registration training and opportunities with students if asked?

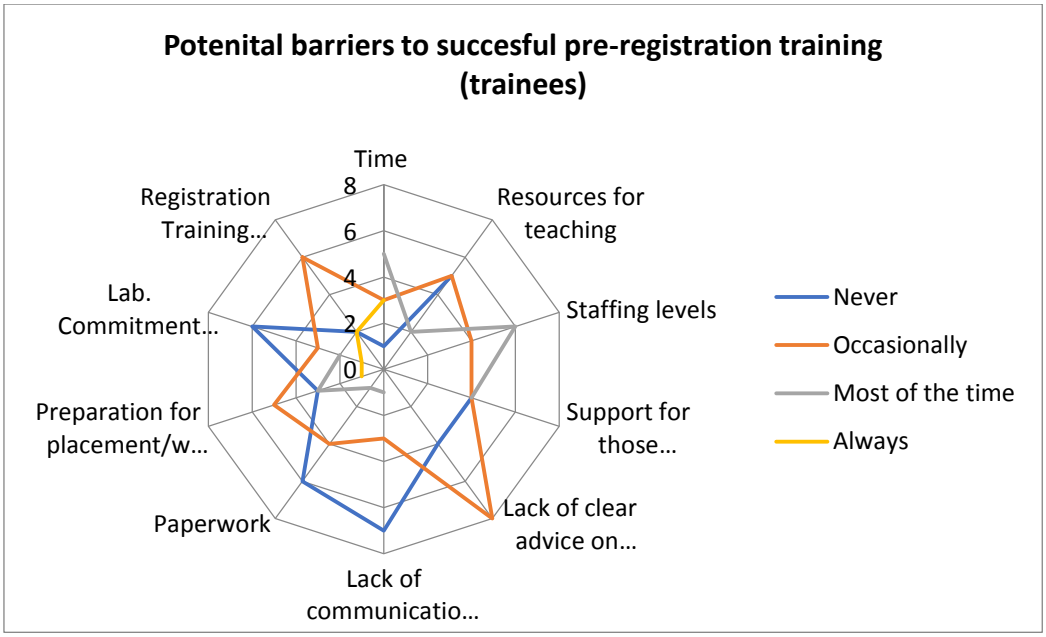




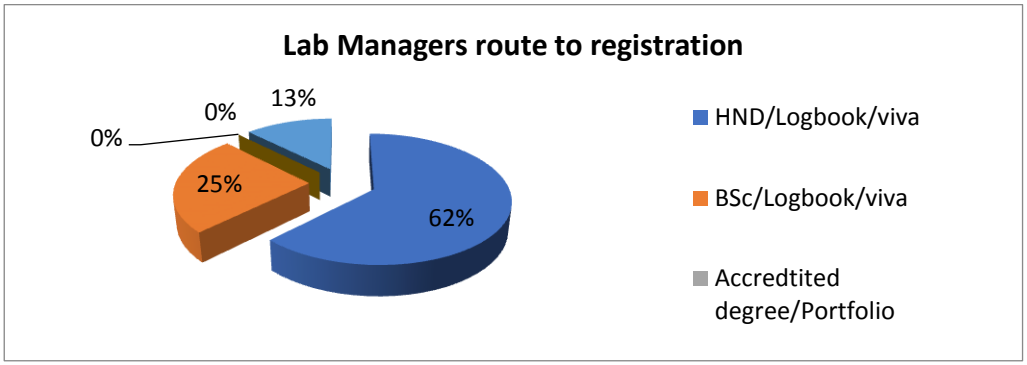
8. What do you think are the main barriers to supporting BMS pre-registration training within your workplace? Rate the following:

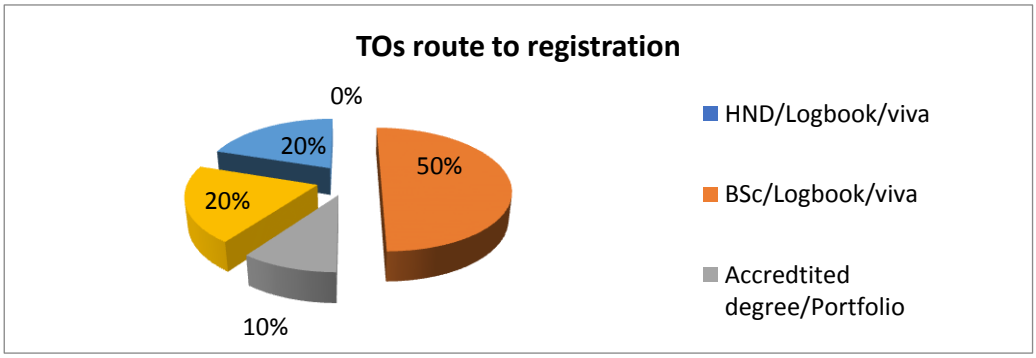






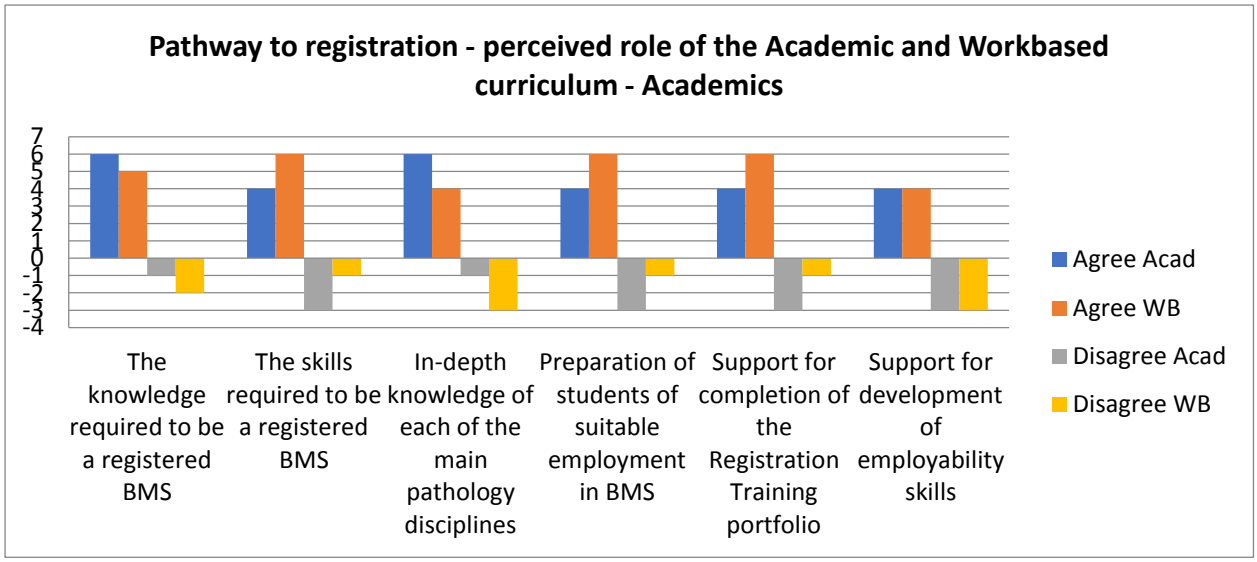
9. Which programme of training did **you** undertake to become a registered BMS?





10. **Pathway to registration –** the following questions relate to the current pathway of accredited degree and laboratory

Each group was asked about their perception of the role of the current pathway leading to registration– looking at both the academic and the work based portion of the curriculum.


Pathway to registration - perceived role of the Academic and Workbased curriculum - Academics
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-1
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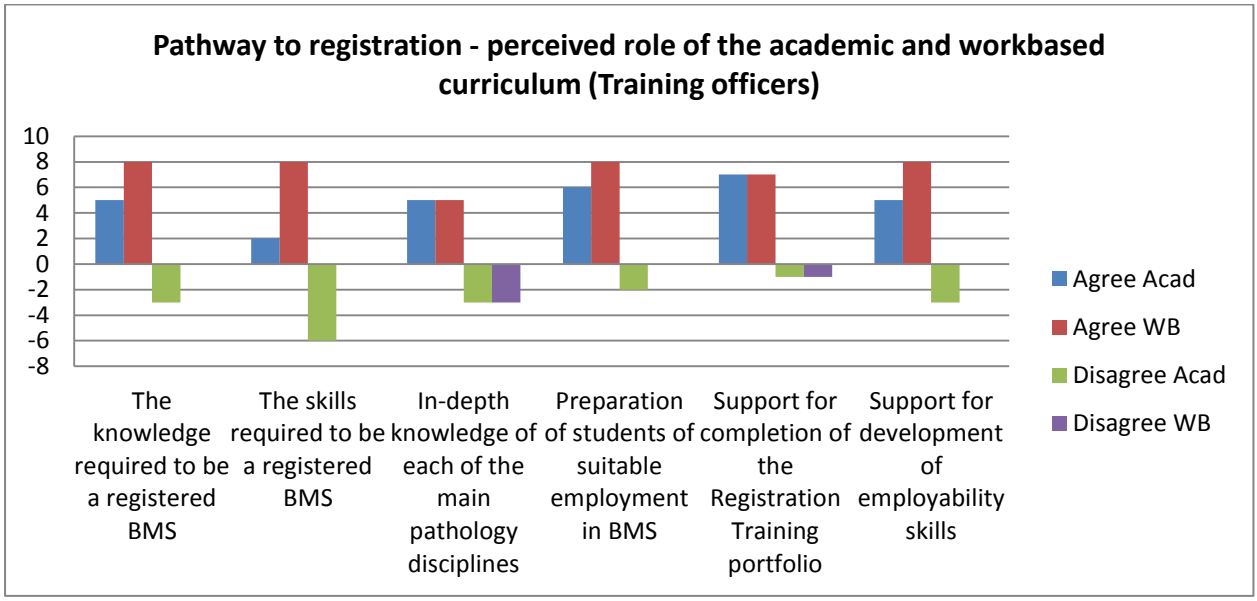
-4
The knowledge required to be a registered BMS
The skills required to be a registered BMS
In-depth knowledge of each of the main pathology disciplines
Preparation of students of suitable employment in BMS
Support for completion of the Registration Training portfolio
Support for development of employability skills
Agree Acad
Agree WB
Disagree Acad
Disagree WB


Pathway to registration - perceived role of the academic and workbased curriculum (Training officers)
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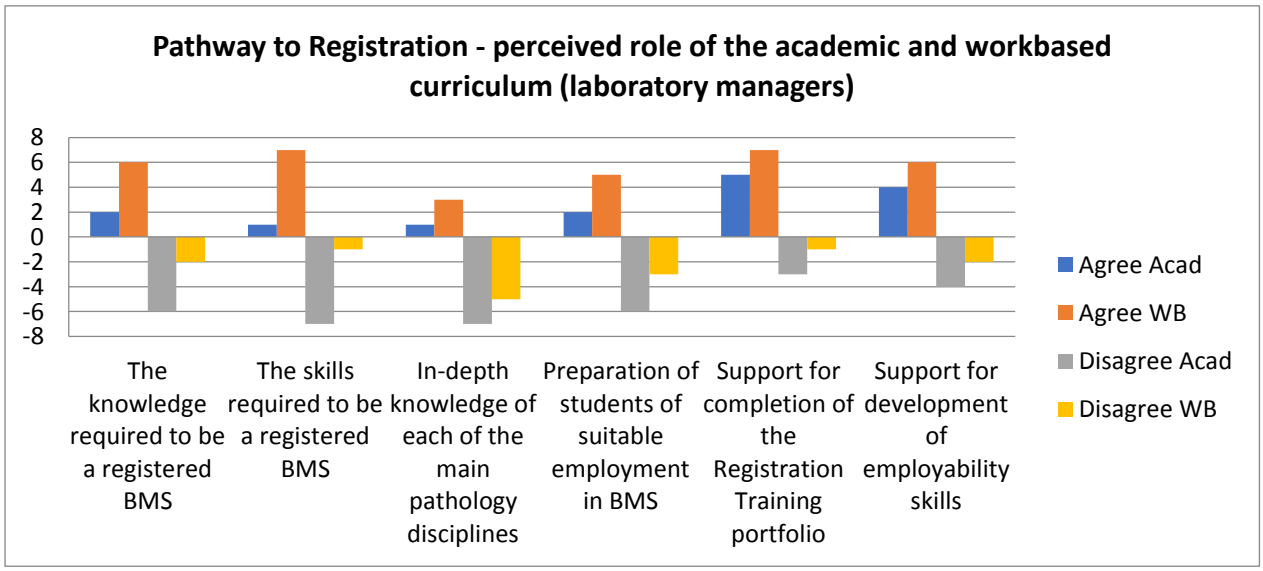
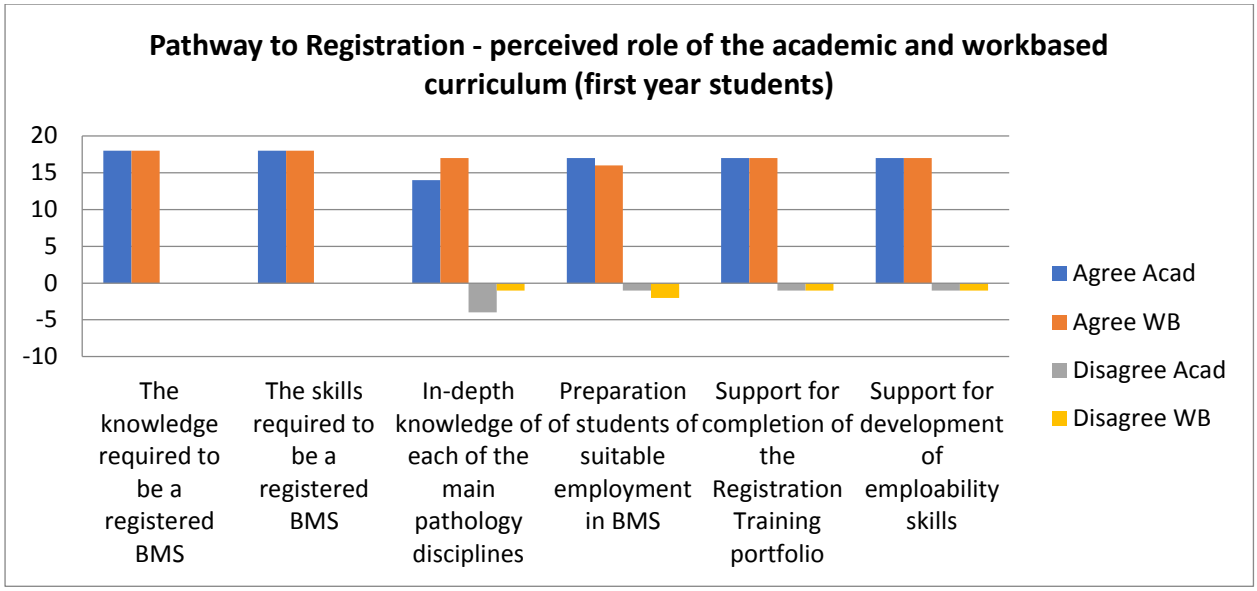
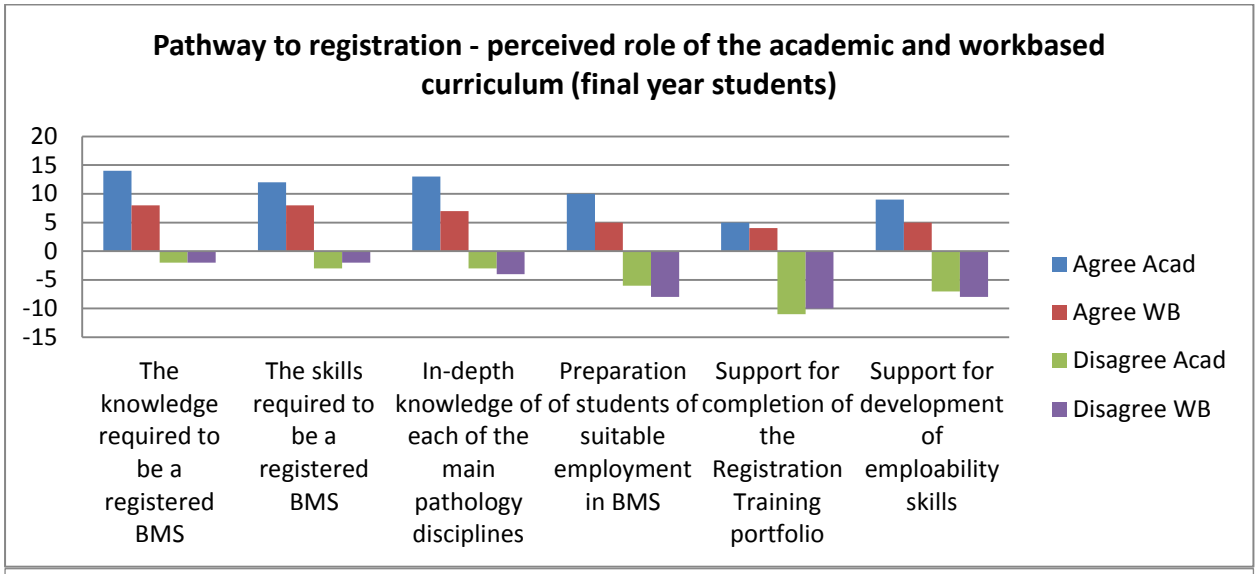
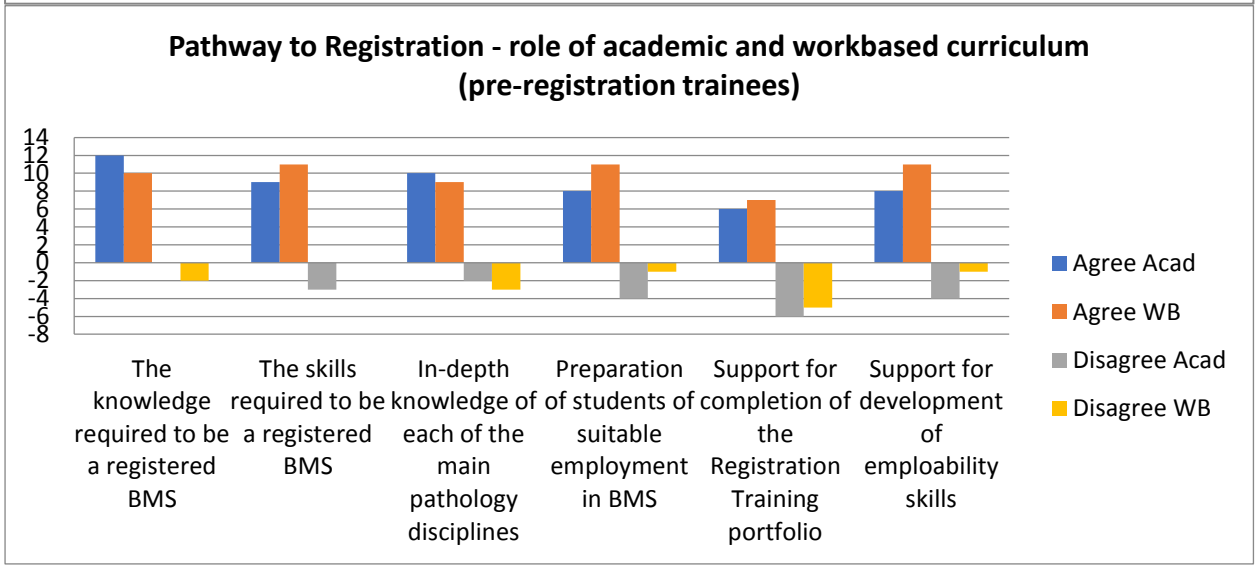
-8
The knowledge required to be a registered BMS
The skills required to be a registered BMS
In-depth knowledge of each of the main pathology disciplines
Preparation of students of suitable employment in BMS
Support for completion of the Registration Training portfolio
Support for development of employability skills
Agree Acad
Agree WB
Disagree Acad
Disagree WB


Pathway to Registration - perceived role of the academic and workbased curriculum (laboratory managers)
8
6
4
2
0
-2
-4
-6
-8
The knowledge required to be a registered BMS
The skills required to be a registered BMS
In-depth knowledge of each of the main pathology disciplines
Preparation of students of suitable employment in BMS
Support for completion of the Registration Training portfolio
Support for development of employability skills
Agree Acad
Agree WB
Disagree Acad
Disagree WB

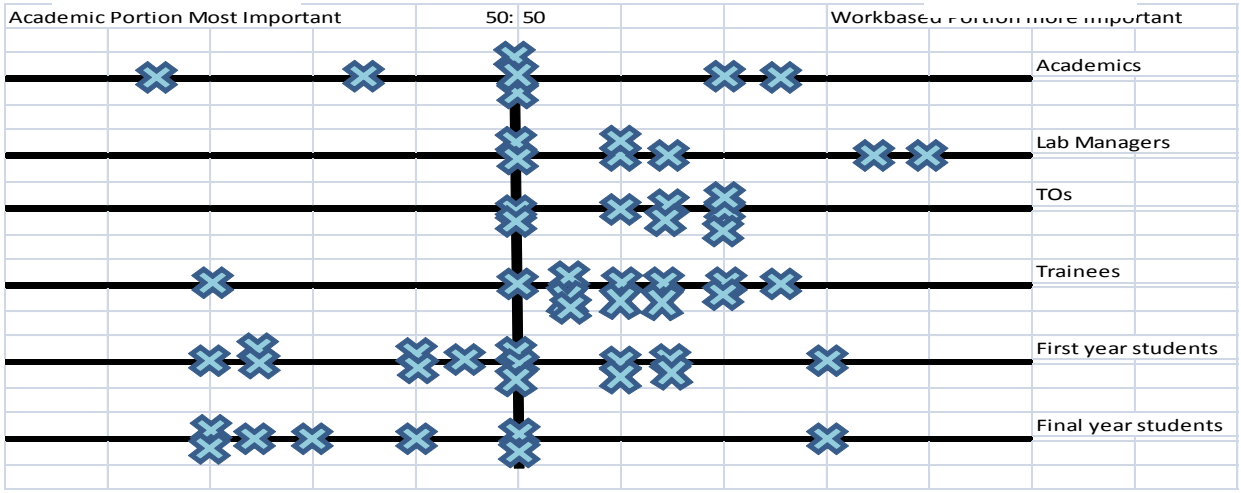

Pathway to Registration - perceived role of the academic and workbased curriculum (first year students)
20
15
10
5
0
-5
-10
The knowledge required to be a registered BMS
The skills required to be a registered BMS
In-depth knowledge of each of the main pathology disciplines
Preparation of students of suitable employment in BMS
Support for completion of the Registration Training portfolio
Support for development of employability skills
Agree Acad
Agree WB
Disagree Acad
Disagree WB


Pathway to registration - perceived role of the academic and workbased curriculum (final year students)
20
15
10
5
0
-5
-10
-15
The knowledge required to be a registered BMS
The skills required to be a registered BMS
In-depth knowledge of each of the main pathology disciplines
Preparation of students of suitable employment in BMS
Support for completion of the Registration Training portfolio
Support for development of employability skills
Agree Acad
Agree WB
Disagree Acad
Disagree WB


Pathway to Registration - role of academic and workbased curriculum (pre-registration trainees)
14
12
10
8
6
4
2
0
-2
-4
-6
-8
The knowledge required to be a registered BMS
The skills required to be a registered BMS
In-depth knowledge of each of the main pathology disciplines
Preparation of students of suitable employment in BMS
Support for completion of the Registration Training portfolio
Support for development of employability skills
Agree Acad
Agree WB
Disagree Acad
Disagree WB

11. Thinking about the importance of the 'academic portion' vs. 'work based portion' of the programme for developing the capable BMS, place a cross on the line below to represent your perception of the relative values of each component.

Academic portion most important | **50:50** | Work-based portion most important



12. What has influenced your approach to training?